

PART III.

PREPARATIONS AND COMPOUNDS.

ACIDS.

THESE are substances which have a sour taste: and are capable of combining with alkalis, earths, and metallic oxides, while at the same time they lose their acidity, and form compounds named neutral salts, in which the properties of the acid, the alkali, the earth, or the oxide employed, are lost. They change to red, the blue, purple, and green colours of vegetables; and unite with water in almost every proportion. These circumstances, therefore, may be regarded as characteristic of this class of substances.

Acids are supposed to be combustible bodies combined with oxygen, which is regarded as the principle of acidity from which they derive their properties; but although it is questionable, whether there is any acid that does not contain oxygen as an essential component, yet it is by no means true that the combination of every combustible with oxygen will constitute an acid. Thus the combination of hydrogen with oxygen forms water which is not acid; and it is now known that the alkalis owe their alkaline properties to the presence of oxygen, as much as the acids owe to it their acid properties.¹ For the formation of an acid, therefore, by the union of any body with oxygen, some principle must be previously present in the body, common, in a greater or less degree, to all bodies capable of being formed into acids, which may be regarded as the principle of acidity, although it be yet unknown.

On the supposition that all acids are compounds of oxygen with certain bases, the name of each is derived from the base of which it is formed; thus, from sulphur comes sulphuric acid; but the same base being capable of uniting with different proportions of oxygen, the terminations *ous* and *ic* are added to indicate the degree of acidification: thus when sulphur is united with the smaller proportion of oxygen, the acid produced is named sulphurous acid; when with the full proportion, sulphuric acid. One or two acids are moreover supposed to combine with a still larger proportion of oxygen, to denote which the syllable *oxy* (for oxygenized) is prefixed:

¹ See Davy's Discoveries, *Phil. Trans.* 1808.

thus muriatic acid supposed to be combined with an excess of oxygen becomes oxymuriatic acid.

The stronger acids require to be kept in glass bottles, furnished with well ground glass stoppers, and having the name of the acid which each contains engraved on the glass. They should be dispensed also in glass stopped phials. The acids known to chemists are very numerous; but of these a small proportion only is employed for medical and pharmaceutical purposes. In the London Pharmacopœia, the arrangement of which we have adopted, they are placed in alphabetical order; but in this place it may be proper first to exhibit them according to the nature of their radicals or bases.

I. ACIDS WITH SIMPLE RADICALS.

SULPHUR { 1. SULPHURIC ACID.

NITROGEN { 2. NITROUS ACID.

{ 3. NITRIC ACID.

II. ACIDS WITH DOUBLE RADICALS.

{ 4. ACETIC ACID.

{ 5. CITRIC ACID.

{ 6. BENZOIC ACID.

{ 7. SUCCINIC ACID.

III. ACIDS WITH UNKNOWN RADICALS.

8. MURIATIC ACID.

9. OXYMURIATIC ACID.

ACIDUM ACETICUM. Lond. *Acetic Acid.*

“Take of vinegar, *a gallon*; distil the acetic acid from a glass retort, placed in a sand bath, into a glass receiver kept cool: throw away the first pint, and preserve the six succeeding pints which are distilled.”

ACIDUM ACETICUM TENUE. Edin. *Weak Acetic Acid.*

“Distil eight pounds of vinegar in glass vessels, with a gentle heat. The pound which first comes over, being too watery, is to be rejected; the five pounds that follow, will be the weak acetic acid. The distillation may be continued as long as a colourless acid comes over; but, this being too much burnt, and unfit for internal use, may be mixed with the pound which first came over, and preserved for various chemical uses.”

ACETUM DISTILLATUM. Dub. *Distilled Vinegar.*

“Take of wine vinegar, *ten pints*; distil with a gentle heat *six pints*. The distillation must be performed in a glass vessel, and the first pound which comes over rejected.”

The specific gravity of this acid is to that of water as 1006 to 1000.

Of the three appellations given to this preparation in the British pharmacopœias, that of the Edinburgh College only

¹ Vinaigre distillé (F.) Distillirter Essig (G.) Aceto distillato (I.) Vinaigre distilado (S.)

is unobjectionable. It is the acetic acid in a more diluted state than that in which it exists in vinegar, but purer; being freed in a great degree from the mucilage, extractive, supertartrate of potash, and other extraneous matters which vinegar contains.¹ The distillation on a large scale is often conducted in the common copper still, or in a tinned still with a pewter worm; but both these practices, as they are apt to give dangerous metallic impregnations to the product, are highly reprehensible, when the distilled vinegar is to be employed for medicinal purposes.

In performing the process, it is more important to avoid carrying the distillation too far, than to reject the first eighth part which comes over; for although this is undoubtedly weaker, and contains a small portion of alcohol, yet it retains about one-twelfth² of the whole quantity of the real acid obtained: but by continuing the process a little too long, the whole product acquires an unpleasant empyreumatic flavour. This is avoided by changing the receiver rather before the quantity ordered has been obtained; and if to the residue be added an equal quantity of hot water and half an ounce of recently burnt animal charcoal³, for every pint of fluid in the retort, the distillation may be recommenced, and an additional portion of the diluted acid obtained, equally pure and strong as the former. At the end of the operation, when dilution has not been employed, the residue is a deep red coloured liquor, strongly acid, very empyreumatic, and which deposits supertartrate of potash.

Qualities.—Distilled vinegar has a fainter and less agreeable odour than common vinegar; a grateful, not strong, acid taste; is limpid and colourless; and of a specific gravity varying from 1.007 to 1.0023. One fluid ounce of spec. grav. 1.007 should dissolve 13.8 grains of marble. It dissolves the gum resins and the acrid principles of plants, such as the squill and meadow saffron; and forms acetates with the alkalies and several of the metallic oxides. Darracq⁴ ascertained that it differs from acetic acid in containing some uncombined mucilage and extractive matter, but that the acids are otherwise the same. It is owing to this extractive that, when distilled vinegar is boiled with potash, the solution has a deep reddish brown colour, and during evaporation carbonaceous matter is deposited. It is sometimes adulterated. Sulphuric acid is detected by a precipitate being produced on the addition of a solution of acetate of barytes; lead and tin, by a solution of sulphuretted hydrogen, forming a

¹ See *Acetum*, Part II.

² *London Medical Review*, No. x. 125.

³ Animal charcoal is made by calcining bones in a crucible, to which is luted a perforated cover. When no more flame issues from the aperture, it must be closed, and the heat raised for half an hour.

⁴ *Annales de Chimie*, xli. 264.

dark-coloured precipitate; and copper, by the acid assuming a blue colour, when supersaturated with ammonia.

Medical properties and uses.—The same as those of common vinegar; but, as it is purer, and not liable to spontaneous decomposition, it is fitter for pharmaceutical purposes.

Officinal preparations. *Liquor Ammoniae Acetatis.* L. E. D. *Potassae Acetas.* L. E. D. *Acetas Ferri.* D. *Liquor Plumbi Subacetatis.* L. D. *Plumbi Superacetas.* L. E. D. *Acetum Colchici.* L. *Acetum Scillae.* L. E. D. *Oxymel.* L. D. *Emplastrum Ammoniaci.* L. *Oxymel Colchici.* D.

ACIDUM ACETICUM. Dub.¹ *Acetic Acid.*

“Take of acetate of kali, (potash), *six ounces*; sulphuric acid, *three ounces by weight*. Pour the acid into a tubulated retort: then add to it in small portions and at different times, the acetate of potash, allowing the mixture to cool after each addition: finally, with a moderate heat, distil the acid until the residue be dry.

“The specific gravity of this acid is to that of distilled water, as 1070 to 1000.”

ACIDUM ACETICUM FORTE. Edin. *Strong acetic Acid.*

“Take of dried sulphate of iron, *one pound*; acetate (*superacetate*) of lead, *ten ounces*. Rub them together; then put them into a retort, and distil in a sand bath with a moderate heat, as long as any acid comes over.”

These processes furnish the same acid as that which is contained in distilled vinegar, but completely freed from extractive and mucilage, and much stronger. In the process of the Dublin College, the sulphuric acid, by reason of its superior affinity for potash, decomposes the acetate of potash, and sets free the acetic acid; which must necessarily come over in a concentrated form, as the acetate does not contain much water, and the greater part of the water of the sulphuric acid is retained by the sulphate of potash which is formed in the retort. The Edinburgh process is that of Badollier, an apothecary of Chartres², with the substitution of sulphate of iron for sulphate of copper. The affinity of the sulphuric acid of the sulphate of iron to the oxide of the acetate of lead, assisted by the heat, decomposes the acetate, and the sulphuric acid uniting with the lead, the acetic acid is disengaged, and distils over. The dried state of the salts enables the acid to be in a concentrated form.³ The process of the Dublin Col-

¹ Acide Acetique (F.) Essigsäure (G.) Acido acetico (I.)

² *Annales de Chimie*, xxxvii. 3.

³ The process of the edition of the London Pharmacopoeia of 1787, for obtaining this acid by the simple distillation of dried subacetate of copper, afforded a much stronger acid than either of these processes. An excellent acetic acid is obtained by decomposing the superacetate of lead at once, by means of sulphuric acid; putting into the retort, before distilling, a small portion of oxide of manganese, as directed by M. Baup. Vide *Journ. de Pharm.* Dec. 1816.

lege is the best; the acid obtained being stronger, not contaminated with any metallic impregnation, and free from sulphurous acid, a small portion of which the other generally contains.*

Qualities.—Acetic acid has a grateful, fragrant, pungent odour; a very sour acrid taste; and, when applied to the skin inflames it and raises a blister. It is limpid, colourless, highly volatile, and if much concentrated, takes fire when heated in the open air. It becomes solid and crystallizes at 38° of Fahrenheit, liquefying again at 40° ; is capable of oxidizing iron, zinc, copper, nickel, and tin; combines with alkalies, earths, and metallic oxides, forming acetates; dissolves resins, gum-resins, camphor, and volatile oils; and combines with alcohol, which, when aided by heat, it converts into a species of ether. With water it unites in any proportion, and during the mixture heat is evolved. From the experiments of Guy Lussac 100 parts of pure acetic acid appear to consist of 50.224 of carbon, 5.629 of hydrogen, and 44.147 of oxygen.

Medical properties and uses.—Acetic acid is stimulant and rubefacient. It is principally employed as a refreshing scent, in syncope, asphyxia, and nervous head-achs; and for obviating the unpleasant smell of the confined air of crowded assemblies and of the sick-room. It is, also, a useful application to warts and corns, which it seldom fails to remove; but in applying it care must be taken to avoid the surrounding skin.

Official preparation. *Acidum acetosum camphoratum.* E. D.

ACIDUM BENZOICUM. Lond.² *Benzoic Acid.*

“Take of benzoin, a pound and a half; lime fresh burnt, four ounces; water, a gallon and a half; muriatic acid, four fluid ounces. Rub the benzoin with the lime; then boil them in a gallon of water for half an hour, constantly stirring with a spatula, and pour off the liquor when it is cold. Boil what remains in four pints of water, and pour off the liquor as before. Afterwards mix the liquors together, and boil them to one half; then filter them through paper, and gradually drop in the muriatic acid until no more precipitation takes place. Finally, having poured off the liquor, dry the powder in a gentle heat; then put it into a proper vessel placed in a sand-bath; and with a moderate fire sublime the benzoic acid.”

Edinburgh.

“Take of benzoin, twenty-four ounces; subcarbonate of soda, eight ounces; water, sixteen pounds. Triturate the balsam with the subcarbonate; then boil them in the water for half

* It may be completely freed from this acid by redistilling it from black oxide of manganese mixed with a small portion of carbonate of potash. *Nicholson's Journal*, xlii. 42.

² Acide Benzoïque (F.) Benzoësäure (G.) Acido Benzoico (I.)

an hour, stirring them constantly, and strain. Boil the residue of the balsam in other six pounds of water, and strain. Mix the strained liquors, and evaporate to two pounds; filter again, and drop in diluted sulphuric acid as long as any precipitation is produced.

"Dissolve the precipitated benzoic acid in boiling water: strain the liquor whilst it is hot through linen, and set it aside to crystallize. Wash the collected crystals with cold water; then dry, and preserve them for use."

Dublin.

"Take of benzoin, *any quantity*. Liquefy it in a wide-necked retort, to which a receiver is adapted but not luted, and sublime. The sublimed matter must be now and then removed from the tube of the retort, lest it accumulate in too great quantity. If it be soiled with oil, press it between folds of blotting paper to separate the oil, and repeat the sublimation."

The process of the Dublin College is the method recommended by Chaptal of separating the acid which the benzoin contains: but although the quantity contained be greater, yet if the fire be not very nicely regulated, a portion of empyreumatic oil is also volatilized, which gives the acid a brown tinge, and cannot easily be entirely separated from it.¹ The London process is in principle the same as that which Scheele published in 1775.² Lime separates the benzoic acid from the resin with which it is united in the balsam, combines with it, and forms a benzoate which is dissolved in the water; whilst at the same time a small portion of resin is also dissolved, and gives the solution a yellow colour. This benzoate is decomposed in its turn by the muriatic acid, which combines with the lime, and forms a soluble muriate; whilst the benzoic acid that is set free, being insoluble in cold water, precipitates in the form of a brownish powder. The subsequent sublimation frees the acid of this colour, and gives it the crystallized form and brilliant appearance of the acid originally obtained by sublimation, without any adhering oil. The Edinburgh process is a modification of this one, introduced by Gren, on the supposition that it is more æconomical, the sulphuric acid being cheaper than the muriatic acid.³ The following are the quantities of acid obtained from one pound of benzoin by these processes, according to Mr. Brande's experiments.⁴

¹ This acid was originally obtained by sublimation. It was described under the name of *flowers of benzoin* by Blaise de Vigenève, in 1608. *Thomson's Chemistry*, 4th ed. ii. 289.

² Scheele, i. 124.

³ Mr. Hatchett has proposed a simpler process than any of the above. He digests the benzoin in sulphuric acid; during which the benzoic acid is sublimed in great quantity very pure, and beautifully crystallized. *Phil. Trans.* 1805.

⁴ *Nicholson's Journal*, x. 88.

	3.	3.	3.	grs.
By Chaptal's (<i>that of the Dublin College</i>)	2	0	0	0
Scheele's (<i>the London</i>) - - - -	1	6	2	19
Gren's (<i>the Edinburgh</i>) - - - -	1	5	1	10

Benzoic acid may also be extracted from the other balsams.

Qualities. — Benzoic acid is, when perfectly pure, inodorous; but as it is usually found in the shops, it has a slight aromatic odour: its taste is pungent, acrid and acidulous. It is in very minute acicular crystals and flakes, soft to the touch and not pulverulent, of a beautiful whiteness, and a silky lustre. Its specific gravity is 0.667. When heated, it melts, emits a suffocating, acrid, vapour and in a strong heat burns with a white flame. Benzoic acid is soluble in twenty-four times its weight of boiling water, and more abundantly in alcohol; but the water lets fall nineteen-twentieths in cooling. With the alkalies, earths, and metallic oxides, it forms benzoates, which are not used in medicine. According to Berzelius it is a triple compound of 74.41 of carbon, 5.16 of hydrogen, and 20.43 of oxygen.

Medical properties and uses. — This acid is stimulant; but, although it is retained by all the pharmacopœias, it is of little value as a remedy.

Official preparations. *Tinctura Camphoræ composita.* L. D.
Tinctura Opii ammoniata. E.

ACIDUM CITRICUM. Lond.² *Citric Acid.*

“Take of lemon juice a pint; prepared chalk, an ounce, or a quantity sufficient to saturate the juice; diluted sulphuric acid, nine fluid ounces. Add the chalk by degrees to the lemon juice heated, and mix them; then pour off the liquor. Wash the citrate of lime which remains, in repeated portions of warm water, and then dry it. On the dried powder pour the diluted sulphuric acid, and boil for ten minutes; express the liquor strongly through a linen cloth, and filter it through paper. Evaporate the filtered liquor with a gentle heat, so that crystals may form as it cools. To obtain the crystals pure, dissolve them in water a second and a third time; filter each solution, boil it down, and put it apart to crystallize.”

This process, which was contrived by Scheele, will seldom require to be performed by the apothecary, as the crystallized acid is now manufactured very pure, and sufficiently reasonable, on the great scale.³ The theory of the process is very simple. The lime of the chalk unites with the citric acid that exists ready formed in the lemon juice, and produces an

¹ To free it from the oil on which its odour depends, dissolve it in alcohol, and precipitate by water. *Phil. Mag.* xiv. 331.

² Acide Citrique (F.) Acido Citrico (I.)

³ The principal manufacturer in London, is Mr. Coxwell of Fleet Street.

insoluble citrate of lime, which precipitates united with some of the mucilaginous and extractive matter of the juice. These are separated by repeated washings; and the sulphuric acid, which is added to the dried citrate, decomposing it, owing to the superior affinity of the sulphuric acid for lime; a sulphate of lime forms while the citric acid is disengaged. The crystals of the first crystallization are dark coloured; which is partly owing to a portion of mucilage that still adheres to the citric acid, and partly to the excess of sulphuric acid acting on the citric acid and decomposing a portion of it. The repeated crystallizations free the crystals from this dark colour; but as it is of some importance to avoid any hurtful excess of sulphuric acid, and as the strength of lemon juice is variable and uncertain, it is better to determine the quantity of acid required by the quantity of chalk employed. For this purpose a portion of the sulphuric acid intended to be used must be previously saturated with the chalk, and the weight of the portion employed accurately ascertained; by the knowledge of which the exact quantity of sulphuric acid required to decompose the citrate may be found. According to the experiments of Proust, 94 ounces of lemon juice saturate 4 ounces of chalk with citric acid, and produce $7\frac{1}{2}$ ounces of dry citrate, which require for their decomposition, and the complete saturation of the lime they contain, 20 ounces of diluted sulphuric acid, composed of one part of the common acid and three parts of water, or of a specific gravity of 1.15. To ascertain, however, the exact point of saturation of the lime with the sulphuric acid, take a little of the clear supernatant fluid, filter it and add to it a few drops of acetate of lead; if no sulphuric acid be present citrate of lead only will be formed, soluble in nitric acid which does not dissolve sulphate of lead.

Qualities. — Pure citric acid is in white, transparent, persistent, rhomboidal prisms, or of two four-sided pyramids joined base to base. It is inodorous; has an extremely acid, almost caustic taste; and reddens strongly the vegetable blues. One ounce of water at 60° Fahrenheit dissolves one ounce and a quarter of this acid; and at 212° twice its weight. The solution when long kept is liable to undergo spontaneous decomposition. Citric acid combines with the alkalies, earths, and metallic oxides, and forms citrates. The sulphuric and nitric acids decompose it. Its components according to Berzelius are 41.37 carbon, 3.80 hydrogen, and 54.83 of oxygen, in unknown proportions. Citric acid may be adulterated with tartaric acid; or with citrate of lime. The first is discovered

¹ *Journal de Physique*, lii. 366.

by nearly saturating the solution with carbonate of potash, when an insoluble super-tartrate will be formed if the tartaric acid be present; the second is detected by dissolving the crystals in water, saturating the solution with ammonia, and adding to it some oxalate of ammonia, which will instantly precipitate the lime, if present.

Medical properties and uses. — The solution of this acid in water, in the proportion of 3j of the crystals to 0j of water, answers nearly all the purposes of recent lemon juice; and is even preferable for forming the common effervescing draught with carbonate of potash. A solution of 3j in 0j of water, sweetened with sugar that has been rubbed on fresh lemon peel, forms a grateful refrigerant beverage, resembling lemonade, and equally useful in febrile and inflammatory complaints. It is said that the crystallized acid is not equally useful in scurvy as the fresh juice of the fruit.

ACIDUM MURIATICUM. Lond.* *Muriatic Acid.*

“Take of muriate of soda dried, *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 when the mixture is cold, add to it the muriate of soda. Pour the remainder of the water into the receiver; and having fitted it to the retort placed in a sand bath, distil over the muriatic acid into this water, with a heat gradually raised until the retort becomes red hot.

“The specific gravity of muriatic acid is, to that of distilled water, as 1.160 to 1.000. If a piece of limestone be immersed in a fluid ounce of it diluted with water, the quantity dissolved ought to be two hundred and twenty grains.”

Edinburgh.

“Take of muriate of soda, which has been previously exposed to a red heat, sulphuric acid, water, of each *two pounds*. Pour the acid, mixed with eight ounces of the water and cooled, upon the muriate of soda, in a glass retort; to which adapt a receiver, containing the remainder of the water, and distil from a sand bath with a moderate fire. In a short time the vessels may be luted together, and the distillation continued to dryness.

“The specific gravity of this acid is, to that of distilled water, as 1.170 to 1.000.

Dublin.

“Take of muriate of soda dried, sulphuric acid, water, of each *six pounds*. Dilute the acid with the water, and after it

* Spiritus Salis, P. L. 1720. Spiritus Salis Marini Glauberi, P. L. 1745. Acide Muriatique (F.) Kochsalzsäure (G.) Acido Muriatico (L.) Ooppoo trāvagum (Tam.)

is cold, add it gradually to the muriate put into a glass retort; then distil the liquor until the residuum becomes dry.

“The specific gravity of this acid is, to that of distilled water, as 1.170 to 1.000.”

The principal difference in these formulæ is in the quantity of sulphuric acid ordered for decomposing the muriate. The sulphuric acid is properly ordered to be diluted, to moderate the strong effervescence, and prevent the too rapid disengagement of the muriatic acid gas, which would both endanger the bursting of the apparatus, and render the process otherwise very unmanageable. The direction of the London and Edinburgh Colleges, to put part of the water into the receiver, is preferable to mixing the whole with the acid, and pouring it on the muriate, as it facilitates very much the condensation. In the manufacturing laboratories, although the process is in principle the same as the above, yet the retort is generally of earthenware or of iron, which communicates the yellow colour that characterizes the common muriatic acid, and which depends on a small portion of iron being raised, and brought over with the acid. Even when iron vessels are not employed the acid often assumes a yellowish colour, which depends either on a small portion of iron in the salt, or from the presence of some oxymuriatic acid.

In this process the decomposition of the muriate of soda is effected by the superior affinity of sulphuric acid for soda; but it would scarcely be so complete were not the affinity of the muriatic acid for the soda also weakened by the heat, which favours its tendency to assume the elastic form, in which state it passes over into the receiver, and is there condensed by the water. The residue of the process is sulphate of soda with an excess of acid; to separate which, without breaking the retort, boiling water may be poured into the retort, after its contents have cooled down to 212° .

Qualities. — Liquid muriatic acid, thus obtained, is a colourless or very pale straw-coloured fluid: it has a strong pungent odour, an intensely sour caustic taste; reddens strongly the vegetable blues, emits white suffocating fumes when exposed to the air, and erodes animal and vegetable substances. It unites with the alkalis, earths, and metallic oxides, forming muriates. When of the specific gravity directed by the Edinburgh and Dublin Pharmacopœias, 100 parts of it, according to Dr. Ure's experiments, contain about 26.32 of real acid; and that by the London 24.90: at least it should be so; but by the present process of the London College the sp. gr. of the acid obtained is 1.142 instead of 1.160; and f3j; decomposes

204 grains of marble only instead of 220, as stated by the college.* The following part of a table, constructed by Dr. Ure², shows the quantity of real acid contained in 100 parts of fluid acid, of different densities, at the temperature of 60°:

Spec. Grav.	Real Acid.	Spec. Grav.	Real Acid.	Spec. Grav.	Real Acid.	Spec. Grav.	Real Acid.
1.1920	28.30	1.1698	24.90	1.1391	20.37	1.1155	16.98
1.1900	28.02	1.1661	24.34	1.1351	19.81	1.1115	16.41
1.1881	27.73	1.1587	23.20	1.1312	19.24	1.1037	15.28
1.1863	27.45	1.1550	22.64	1.1293	18.96	1.0999	14.72
1.1790	26.32	1.1510	22.07	1.1253	18.39	1.0883	13.02
1.1753	25.75	1.1491	21.79	1.1233	18.11	1.0805	11.88
1.1715	25.19	1.1471	21.51	1.1214	17.83	1.0707	10.47
1.1679	24.62	1.1410	20.66	1.1194	17.55	1.0590	8.77

Notwithstanding the endeavours of all the most eminent chemists to ascertain the components of muriatic acid, they remain still unknown. It cannot be obtained perfectly free from water; although in some combinations it is nearly so; in which state Sir H. Davy has ascertained that its acidity is suspended, but is instantly restored on the addition of water. The fluid muriatic acid found in the shops often contains sulphuric acid and small portions of iron, sometimes copper; the first is detected by diluting the acid with 5 or 6 parts of distilled water, and adding a few drops of muriate of barytes³, which is precipitated white if sulphuric acid be present; iron is discovered by saturating the diluted acid with carbonate of soda, and adding prussiate of potash; if a blue precipitate be formed, it may be concluded that iron is present. A blue colour being produced by supersaturating the acid with ammonia detects copper.

Medical properties and uses. — This acid is tonic, and antiseptic. It has been efficaciously used in typhus fevers, and in some cutaneous eruptions. It is a common and useful adjunct to gargles, in the proportion of from fʒss to fʒij in fʒvj of any fluid, in ulcerated sore-throats, and cancrum oris; and, in a very highly diluted state, viz. mʒiij in fʒiv of water, it has been recommended as an injection in gonorrhœa.

This acid has even been regarded as an antidote in general syphilitic affections; but the observations of Mr. Pearson have

* Philips's *Experimental Examination*, p. 11.

² Dr. Ure has given satisfactory proofs of the erroneous data on which Mr. Kirwan's table was formed. *Annals of Phil.* vol. x. p. 369.

³ Mr. Hume discovered that muriatic acid precipitates muriate of barytes when no sulphuric acid is present; but this does not happen when the acid is much diluted.

showed this opinion to be erroneous; yet, by its salutary effects on the stomach and general health, "it is a medicine capable of ameliorating the appearance of venereal ulcers, and of restraining for a time the progress of the disease," where it is desirable "to gain a little time, previously to the entering on a mercurial course."¹ The dose is from mx to mxx in a sufficient quantity of water. When taken as a poison, it may be detected by its sensible qualities; but if mixed with wine or other fluids, let a portion of it be distilled from a small retort over a candle, into a phial containing a solution of nitrate of silver. The precipitation of muriate of silver, which is soluble in ammonia, but not in nitric acid, will take place if the poison contain muriatic acid. The best antidotes, if exhibited in time, are soap and calcined magnesia suspended in water.

A very important property of muriatic acid, in the state of gas, is the power it possesses of neutralizing putrid miasmata, discovered by Morveau in 1773. It is therefore used as an agent for destroying infection in sick-rooms and hospitals, disengaged by pouring sulphuric acid on common salt.

Official preparations. *Murias Barytæ*. E. *Solutio Muriatis Calcis*. E. D. *Tinctura Ferri Muriatis*. L. E. D.

ACIDUM MURIATICUM DILUTUM. Dub. *Diluted Muriatic Acid*.

"Take of muriatic acid, and of distilled water, each one pound by weight. Mix them. The specific gravity of this acid is, to that of water, as 1.080 to 1.000."

This formula is intended to render the dose of muriatic acid more easily apportioned: 100 parts contain about 14 of real acid.

AQUA OXYMURIATICA. Dub.² *Oxymuriatic Water*.

"This is prepared by transmitting the superfluous gas of the process for making the solution of oxymuriate of soda, *aqua alcalina oxymuriatica*, by means of a proper apparatus, through a pint of distilled water.

"The specific gravity of this solution is, to that of water, as 1.003 to 1.000."

In the process by which this acid solution is prepared, the oxymuriatic acid comes over in the gaseous form, and is condensed in the distilled water, which is placed in a Woolfe's bottle, connected by a tube with a receiver that contains a solution of subcarbonate of potash. The gas first passes through the alkaline solution, part of it condenses and combines with the potash, forming a neutral salt, while the super-

¹ Pearson on Remedies for Lues Venerea, 194.

² Acide muriatique oxigéné (F.) Vollkomme Salzsäure (G.) Acido muriatico ossigenato (I.)

fluous uncondensed portion passes on to the next bottle, and there combines with the water; forming this solution, which is generally termed oxymuriatic acid. It ought to be preserved in opaque bottles, as light decomposes it.

This acid was discovered by Scheele in 1774, while making his experiments on manganese.

Qualities. — The saturated solution of oxymuriatic acid has a very offensive suffocating odour; and a harsh, styptic, but not acid taste. Its colour is a very pale yellowish green; it destroys all the vegetable colours, rendering them white; and is itself decomposed by exposure to light; owing either to oxygen gas being disengaged by the light; or, according to the new theory, to the decomposition of the water, the hydrogen of which, uniting with the chlorine, forms muriatic acid, that remains in solution in the water, while the oxygen is set free. At a temperature of 50° this solution contains about twice its volume of real acid, the constituents of 100 parts of which, following the old theory, according to the experiments of Berthollet, corrected by those of Chenevix, are 84 of muriatic acid, and 16 of oxygen.*

Medical properties and uses. — Fluid oxymuriatic acid is stimulant and antiseptic. It has been strongly recommended in scarlatina and malignant sore throat; and as an antisiphilitic remedy. In the latter disease the same opinion may be given of it as of the simple muriatic acid; but in scarlatina and cynanche maligna more benefit has resulted from its use. From f3fs to f3ij, mixed in f3viiij of water, and sweetened with a little syrup, may be taken in the course of the day, in divided doses.

But the most important use of oxymuriatic acid is in its gaseous form, as a fumigation for neutralizing putrid miasmata, and correcting the infectious atmosphere of hospital wards and rooms in which have been cases of contagious fevers. For these purposes it is better adapted than the common muriatic acid gas; but as both of them are highly deleterious to animal life, they should be employed in such apartments only as the sick can be removed from while the gas is extricated. The oxidized vapours are easily procured by pouring f3vj of strong sulphuric acid on a mixture of 3iv of pulverized manganese, 3viiij of common salt, and f3ij of water, in a china cup. The doors of the room to be fumigated must be kept shut for two hours after the cup with this charge is placed in it; then be thrown open, and a free current of air permitted to pass through the apartment. By this process

* *Chemical Statics*, ii. 169.

the offensive odour of the sick room is destroyed, the chemical constitution of the deleterious atmosphere altered, and its freshness completely restored.

For the more convenient application of this powerful agent, Morveau has invented what he terms disinfecting or preservative bottles. The apparatus consists of a strong glass bottle or phial, covered with a plate of glass, which is fitted by grinding so as to shut accurately the orifice of the vessel. The bottle is fixed in a wooden frame; and the plate of glass kept in its place, and closely applied by means of a screw. If the bottle be of 25 cubic inches of capacity, the charge to be put into it may consist of 372 grs. of black oxide of manganese in coarse powder, 3.5 cubic inches of nitric acid of 1.4 specific gravity, and an equal bulk of muriatic acid of 1.134 specific gravity. As soon as the charge is introduced, the glass plate must be firmly screwed down in its place. When the apparatus is to be used, the screw is to be turned so as to allow the gas which is extricated to escape from under the plate of glass; and this must be again screwed down, as soon as the smell of the oxymuriatic gas is perceptible in the distant corners of the apartment. Bottles of any dimensions may be used, but the charge must in no case occupy more than one-third part of the capacity of the vessel.

ACIDUM NITRICUM, Lond.* *Nitric Acid.*

“Take of nitrate of potash dried, and sulphuric acid, each two pounds; mix them in a glass retort; and distil the nitric acid from a sand-bath, until red vapours are produced. Then having added an ounce of dried nitrate of potash, redistil the acid in a similar manner.

“The specific gravity of this acid is, to that of distilled water, as 1.500 to 1.000. If a piece of limestone be immersed in a fluid ounce of it diluted with water, 480 grains ought to be dissolved.”

Edinburgh.

“Take of nitrous acid, any quantity. Put it into a retort, and having fitted a receiver, which must be kept cold, apply a very gentle heat until the reddest part shall have passed over, and the acid which remains in the retort already almost free from colour, have become nitric acid.”

ACIDUM NITROSUM. Edin. *Nitrous Acid.*

“Take of nitrate of potash bruised, two pounds; sulphuric acid, sixteen ounces. Pour the acid upon the nitrate of potash in a glass retort, and distil from a sand bath with a gradually

¹ Acidum Nitrosum, P.L. 1787. Spiritus Nitri Glauberi. Aquafortis, P.L. 1743. Aquafortis simplex et duplex, P.L. 1720. Acide nitrrique (F.) Sulpener saure (G.) Acido Nitrico (L.)

augmented heat, until the iron pot becomes obscurely red hot.

"The specific gravity of this acid is, to that of distilled water, as 1.520 to 1.000."

Dublin.

"Take of nitrate of kali, *six pounds*; sulphuric acid, *four pounds* by weight. Mix and distil until the residue becomes dry.

"The specific gravity of this acid is, to that of distilled water, as 1.500 to 1.000."

In performing these processes it is advisable to use a Woolfe's apparatus, or a range of two or three globular receivers, the last of which should contain a small portion of water. The nitric acid is separated from its combination with potash in the nitrate by the superior affinity of the sulphuric acid for the potash, which, however, requires to be aided by quantity, a larger portion of sulphuric acid than is necessary for saturating the potash of the nitrate being used; and also by heat, which volatilizes the nitric acid as it is disengaged. As soon as the materials are heated, orange-yellow vapours are disengaged, which in a short time become paler, and continue so until the ingredients in the retort are nearly dry, and the heat is much augmented; when, owing to a partial decomposition of the acid next disengaged, nitrous oxide comes over in deep red fumes, with a quantity of permanently elastic pure oxygen, which may be collected in an inverted receiver filled with water, placed in a pneumatic trough, and connected with the last receiver by means of a bent tube. The nitrous oxide combines with the condensed acid in the receiver, deepens its colour, and gives it that form which constitutes nitrous acid. It is with the view of preventing this, that the London College has ordered so large a portion of sulphuric acid to be employed, the principal use of which appears to be to contribute a sufficient portion of water to preserve the constitution of the nitric acid; for although a larger proportion of this acid be obtained by following the directions of the London formula, yet it is actually weaker than that which is obtained either by the Edinburgh or the Dublin processes. The Edinburgh College orders the acid to be kept in this form; and as a medical agent it answers the same purposes as the colourless acid; for, when both are diluted with water, they have the same appearance, and are brought to the same state, the addition of the water expelling completely the nitrous

* For the preparation of this acid on a large scale in this country, rough nitre with half the weight of sulphuric acid is employed. These are put into a large glass body, to which a glass pipe is luted communicating with an empty receiver, which is connected, by means of pipes also, with several other receivers half filled with water.

oxide, which is only loosely united with the nitric acid to form the nitrous. The quantity of acid obtained is about half the weight of the nitrate employed; and the residue is a white spongy saline cake of sulphate of potash with an excess of sulphuric acid, which may be dissolved out of the retort by hot water.

By the London process the nitric acid is at first obtained tolerably free from nitrous oxide; but in general the re-distillation, as directed, will be found necessary. In the expulsion of the nitrous oxide, to change the nitrous into nitric acid, according to the directions of the Edinburgh College, a portion of the acid is carried over with the gas, as nitrous acid vapour; which should not be wasted, but be condensed by a small portion of water being put into the receiver, and thus form a diluted acid. Mr. Murray¹ justly observes, that the heat of a water-bath is best adapted for this operation, being sufficient for the purpose, and not too high to produce the decomposition of the acid. A completely colourless acid, however, is not obtained, unless the acid be re-distilled from a small portion of black oxide of manganese, but this is not at all necessary for medical purposes.²

As nitre sometimes contains a small portion of muriate of soda, nitric acid, in whatever method it has been procured, may be contaminated with a minute portion of muriatic acid; or of sulphuric acid, if a large proportion of this has been used for decomposing the nitre: the presence of the first is detected by dropping in nitrate of silver, which forms an insoluble muriate of silver; while the formation of a precipitate on the addition of muriate of barytes discovers the second. These contaminations do not affect the medicinal virtues of the acid.

Qualities. — *Nitrous acid*, as the term is understood in the Edinburgh Pharmacopœia, is a yellow or orange-coloured fluid, emitting, when exposed to the air, deep-orange-coloured extremely suffocating fumes. In its chemical affinities and other qualities it agrees in many respects with nitric acid. It consists of nitrous gas loosely combined with nitric acid and water; and the colour varies according to the proportion of nitrous gas which is present. From experiments made by Sir H. Davy³ on this subject, the following appear to be the proportions in the three states in which nitrous acid is usually procured for pharmaceutical purposes.

¹ *System of Materia Medica*, ii. 184.

² Nitric acid was first obtained by Raymond Lully, in the 13th century, by distilling a mixture of nitre and clay, a process still employed on the continent. The name *Nitric acid* was imposed in 1787, by the French chemists.

³ *Researches*, 37.

100 Parts of Acid.	Spec. Gravity.	Real Nitric Acid.	Water.	Nitrous Gas.
Pale yellow	1.502	90.5	8.3	1.2
Bright yellow	1.500	88.94	8.10	2.96
Dark orange	1.480	86.84	7.6	5.56

The Edinburgh College states the specific gravity too high, for it seldom exceeds 1.502, and scarcely ever 1.52.¹ When one part by weight of water is added to four parts of yellow nitrous acid, the colour is altered to a fine green; when equal parts of both are mixed, it becomes blue; and by another addition of water, or by allowing it to stand exposed to the air, it changes to a very pale straw-colour, or becomes nearly colourless.

Nitric acid is a colourless, or very pale yellow, limpid fluid, emitting, when exposed to the air, white suffocating vapours, and possessing strong acid properties. It is highly corrosive, and tinges the skin yellow, the tint remaining till the epidermis peels off. It unites with water in every proportion, and while mixing heat is evolved. The following table, constructed by Sir H. Davy², shows the quantity of real acid and water contained in 100 parts of fluid acid of different densities:

100 Parts Nitric Acid of specific gravity.	Contain of		100 Parts Nitric Acid of specific gravity.	Contain of	
	True Acid.	Water.		True Acid.	Water.
1.5040	91.55	8.45	1.3186	52.03	47.97
1.4475	80.39	19.61	1.3042	49.04	50.96
1.4285	71.95	28.35	1.2831	46.03	53.97
1.3906	62.96	37.04	1.2090	45.27	54.73
1.3551	56.80	43.12			

Nitric acid is volatilized by heat, and decomposed by light. It is also decomposed by all the simple combustibles, with great violence of action; is capable of oxidizing all the metals; and combines with the earths, alkalies, and metallic oxides, forming nitrates; one fluid ounce of specific gravity 1.500 should dissolve 476 grains of white marble. The constituents of nitric acid, independent of the water, which gives it the fluid form, are 25.97 azote, and 74.03 oxygen, in 100 parts.

Use. — Strong fluid nitric acid is used only for pharmaceutical purposes; except when extricated in the form of vapour

¹ Ronelle states the specific gravity of the strongest nitric acid that can be procured to be 1.583; Kirwan makes it 1.5543 only, at 60° Fahrenheit.

² *Researches*, 41.

when it is employed for destroying contagion. It is less powerful than the oxymuriatic acid, but is more generally useful, as it can be extricated in the chambers of the sick without proving deleterious to animal life.¹ For this purpose f3ij of sulphuric acid may be poured over ʒiv of coarsely powdered nitre in a china cup, and placed in a pipkin of hot sand. This quantity is sufficient for fumigating a room of ten feet square; and, where a larger portion is required, it is more advisable to multiply the number of pipkins, than to put a larger quantity of the materials into one vessel.

Official preparations. *Acidum nitricum dilutum*. L. E. D. *Argenti Nitras*. L. E. D. *Ung. Hydrargyri Nitratis*. L. E. D. *Hydrargyri Nitrico-oxydum*. L. *Spiritus Ætheris nitrici*. L. E. D. *Unguentum Acidi nitrosi*. E. D.

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

“Take of nitric acid, a fluid ounce; distilled water, nine fluid ounces. Mix.”

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

“Take of nitrous acid, and of water, equal weights. Mix, avoiding the noxious vapours.”

Dublin.

“Take of nitrous acid, and of distilled water, each one pound. The specific gravity of this mixture is, to that of distilled water, as 1280 to 1000.”

These processes are intended for the more convenient apportionment of the dose in the exhibition of this acid. In the former edition of the London Pharmacopœia the proportions of acid and water were equal by weight; but the alteration in the present edition makes a very important difference of strength, in a given measure of the diluted acid, prepared after the former, and the latter of the above formulæ.

When prepared according to the directions of the London College, f3i contains about grs. 68·17 of nitric acid, of 1·500 specific gravity, while the same measure of the same acid, prepared after the Edinburgh and Dublin, and the former London formulæ, contains grs. 390·5 of the same acid; a difference which may lead to errors in practice; and is, therefore, to be regretted, particularly as no reason is assigned for the change.

Medical properties and uses.—Nitric acid is tonic and antiseptic. When largely diluted with water it forms an agreeable and very useful beverage in fevers, particularly of the typhoid type. In larger doses, less diluted, it has been efficaciously administered in chronic hepatitis, even when dropsy has supervened; and has also been found serviceable in restraining

¹ *The Effects of Nitrous Vapour, &c.* by J. C. Smyth, M. D.

violent sickness, in dyspepsia, asthma, and the majority of the cachexiæ. From some observations of Mr. Scott, published at Bombay in 1796, this acid excited considerable attention as a remedy for syphilis; but after the most ample trials, by almost every practitioner of any eminence in the country, its antisiphilitic powers have not been found by any means to answer the accounts of them transmitted from India. The subsequent publications of Dr. Scott, however, have shown, that he did not employ nitric acid, but a mixture of three parts of muriatic acid, and two of nitric. It checks for a time the progress of the disease, but does not permanently remove the symptoms; and, as Mr. Pearson justly observes, "it would by no means be warrantable to substitute the nitrous (or nitric) acid in the place of mercury, for the cure of venereal 'complaints.'" It is, however, in many cases of much benefit during a mercurial course, or prior to its commencement, when the constitution is impaired, and inadequate to support the effects of mercury; as by its tonic powers it promotes the general health, and lessens the action of the mercurial remedy on the mouth and fauces: yet when it is pushed far, it affects the mouth, and produces ptyalism. When dropsy supervenes on reiterated courses of mercury, which is not unfrequent in broken down constitutions, this acid, Mr. Carmichael observes, given in as large doses as the stomach will permit, conjoined with digitalis, is productive of the utmost benefit. We have found it of considerable service, given at the same time with mercury, in old obstinate ulcerations of the legs, although no venereal taint could be suspected: and it is employed with benefit as a local stimulant in the form of lotion, in the proportion of f3ij of the diluted acid, to Oj of water, to fœtid ulcers, attended with a thin ichorous discharge, and in caries of the bones. In India, and in this country for some years past, it has been used combined with muriatic acid, in the form of a bath, and in this state produces the same effects as when it is taken internally. Diluted nitric acid has often been employed as a poison. It is detected by the orange-coloured spots, which are observed on the lips, chin, and hands of the patients; and, if death be the result, by the same colour being found in a large portion of the alimentary canal, the mucous membrane of which is converted into a fatty substance, and the stomach often perforated. If any of the fluid can be obtained, the extrication of orange-coloured fumes on boiling it over copper filings, is a certain test of aquafortis. Soap, and calcined magnesia suspended in water, are the best antidotes.

Pearson on Remedies for Lues Venerea, 168.

The dose of the diluted acid is from $\mathfrak{m}x$ to $\mathfrak{m}xxx$ in $\mathfrak{f}z\mathfrak{iij}$ of water, given three or four times a day. When used as a bath, the mixed acid should be added to the water, until it is about as sour as weak vinegar.

ACIDUM SUCCINICUM. Edin.¹ *Succinic Acid.*

“Take of amber in powder, and pure sand, *equal parts*; mix and put them into a glass retort, of which they may fill one half. Having adapted a large receiver, distil from a sand-bath, with a gradually raised fire. A watery liquor with a little yellow oil will first distil over: then a yellow oil with an acid salt; and lastly, a reddish and black oil. Pour the liquor out of the receiver, and let the oil be separated from the water. Press the acid salt collected in the neck of the retort, and on the sides of the receiver, between folds of bibulous paper, that it may be freed from the adhering oil; then purify it by solution, in hot water and crystallization.”

ACIDUM SUCCINICUM. Dub. *Succinic Acid.*

“Take of amber, and pure sand, *each a pound*. Distil, with a gradually increased heat, an acid liquor, an oil, and a salt discoloured with oil. Wrap up this salt in bibulous paper, and subject it to the press to separate the oil; then let it be again sublimed.”

The use of the sand in these processes is to prevent the amber, which swells very much, from passing over into the receiver. The heat which is necessary for the complete decomposition of the amber is very considerable; and therefore, by following exactly the formulæ of the Colleges, this is scarcely ever accomplished. The succinic acid is partly dissolved in the water which condenses in the receiver, but the greater part is sublimed in the neck of the retort, and is so much contaminated with the oil, that after repeated solution and crystallization, and even resublimation, it still retains a portion of it. According to Guyton Morveau², it may be obtained perfectly pure by distilling from it a small portion of nitric acid, with a heat not strong enough to sublime the succinic acid.

Qualities.—The crystals of succinic acid are minutetriangular prisms. When pure, they are white, translucent, and shining; have a slight penetrating sour taste; redden infusion of litmus, and are volatile and inflammable, burning away without leaving any odour. They are soluble in 24 parts of water at 60°, and 2 parts at 212°; the greater part however crystallizing as the water cools. They are also soluble in alcohol, and in sulphuric and nitric acid, without suffering decomposition. With the alkalies, earth, and metallic oxides, succinic acid combines

¹ Acide Succinique (F.) Bernsteinsäure (G.) Acido Succinico (L.)

² *Annales de Chimie*, xxix. 165.

and forms succinates. It is a triple compound of 47.600 parts of carbon, 4.512 of hydrogen, and 47.888 of oxygen.¹

This acid is often adulterated with tartaric acid, muriate of ammonia, and sulphate of potash. The first is detected by carbonate of potash; the second, by nitrate of silver; and the sulphate by barytic water. It is altogether discarded from practice.

ACIDUM SULPHURICUM DILUTUM.² Lond. *Diluted Sulphuric Acid.*

“Take of sulphuric acid, *a fluid ounce and a half*; distilled water, *fourteen fluid ounces and a half*. Add the acid gradually to the water, and mix.”

Edinburgh.

“Take of sulphuric acid, *one part*; water, *seven parts*; mix them.”

Dublin.

“Take of sulphuric acid, *two ounces by weight*; distilled water, *fourteen ounces by weight*. Mix them gradually, and set the mixture aside to cool; then pour off the clear liquor. The specific gravity of this acid is, to that of water, as 1090 to 1000.”

It is very much to be regretted, that the London College, when it altered the proportions of acid and water in this mixture, from those in the last edition of its Pharmacopœia, did not adopt the proportions ordered by the two other colleges, so that, in this preparation at least, a standard strength might have been fixed for the whole kingdom. The reasons which induced it to adopt the present proportions are not easy to be conceived; for the puerile reason stated by Dr. Powell, that “this mixture will be more conveniently made, and its dose more easily apportioned than the former one,” cannot surely have operated in causing the alteration. The diluted acid of the former edition of the London Pharmacopœia consisted of eight parts by weight of water, and one of acid, or the mixture contained $\frac{1}{8}$ of strong acid; while the proportions of the present diluted acid are nearly five parts and a half by weight of water to one of acid; or, one fluid ounce of the diluted acid contains 78.82 grains of the strong acid: in the Edinburgh and Dublin pharmacopœias it constitutes an eighth part.

Owing to the great affinity of sulphuric acid for water, and the density of the mixture being much greater than the mean of the separated acid and water³, a very considerable increase

¹ *Annals of Philosophy*, vol. v. p. 99.

² *Acidum Vitriolicum dilutum*, P. L. 1787. *Acide sulphurique étendu d'eau (F.)* Verdünnte Schwefelsäure (G.) Acido solforico diluito (I.)

³ It is a curious fact that, after the mixture has cooled down to the temperature of the atmosphere, a considerable time elapses before it acquires its real density.

of temperature is produced during their combination, sufficient to crack the glass vessels in which it is made, if the two ingredients be at once mixed together.¹ To prevent such an accident, the acid must be gradually added in small portions to the whole of the water, and the mixture agitated after every addition. It is of importance always to ascertain the specific gravity of the acid before the mixture be made. The mixture, when it has cooled down to the temperature of the atmosphere, lets fall a white precipitate, consisting of a small portion of sulphate of potash, and of sulphate of lead, which the strong acid always contains, but which the diluted acid is incapable of holding in solution. The diluted acid is thus purer than the strong acid, which suffers no other alteration except in point of strength: and hence the Dublin College properly directs the clear liquor to be poured off when the mixture has cooled.

Medical properties and uses.—Diluted sulphuric acid is tonic, antiseptic, and refrigerant. Its tonic and antiseptic powers, render it extremely serviceable in low typhoid fevers, dyspeptic affections, diabetes, convalescencies, and in cutaneous eruptions. It restrains the colliquative sweats which attend hectic: locally applied, it is a common and useful adjunct to gargles in cynanche, and to check salivation; and as a refrigerant, it is given with certain benefit in passive hæmorrhagies, from whatever part they may arise. In the first-mentioned cases, the diluted acid may be combined with infusions of cinchona or other vegetable bitters, and aromatics; and in the latter, with infusion of roses, mucilage, or simple water sweetened with syrup. The usual dose is from $\mathfrak{m} \times$ to $\mathfrak{m} \text{ xxx}$, but in malignant erysipelas, with a tendency to hæmorrhagy, it has been given to the amount of $\mathfrak{f}\mathfrak{ssj}$ in twenty-four hours; and we have given it, with evident advantage, to the same amount, in violent uterine hæmorrhagies.

ACIDUM SULPHURICUM AROMATICUM. Edin.
Aromatic Sulphuric Acid.

“Take of alcohol, *two pounds*; sulphuric acid, *six ounces*. Drop the acid gradually into the alcohol. Digest the mixture in a covered vessel with a very gentle heat for three days; then add of cinnamon bark, bruised, *one ounce and a half*; ginger root, bruised, *one ounce*. Digest again in a closed vessel for six days; then filter through paper placed in a glass funnel.”

This preparation is generally regarded as an imperfect ether; but we are of opinion that the reciprocal action of the acid and alcohol during the digestion is scarcely sufficient to produce

¹ If one part by weight of sulphuric acid of 1.845 specific gravity be mixed with one-fourth its weight of water, the caloric instantly evolved is sufficient to raise the thermometer from 60° to 300°.

such an effect; and the acid undoubtedly very much predominates. It is therefore a simple alcoholic solution of sulphuric acid, holding dissolved, also, the essential oil of cinnamon and of ginger.

Qualities.—The odour is peculiar and aromatic; the taste gratefully acid. It is limpid, and of a brownish colour.

Medical properties and uses.—This is an agreeable mode of exhibiting sulphuric acid in dyspepsia, chronic asthma, and most of the complaints for which the diluted acid has been found serviceable. The dose is from $\mathfrak{m}\text{x}$ to $\mathfrak{m}\text{xxx}$ in any convenient fluid vehicle, given three or four times a day.

ALKALIES¹ AND NEUTRAL SALTS.²

THE general term ALKALI comprehends under it substances possessed of very important chemical properties, and capable of producing very powerful effects on the animal œconomy. They have an acid, urinous taste; are caustic, or dissolve animal matter; change the blue vegetable colours to green; serve as the means of combining oil and water; are capable of being fused and volatilized by a strong heat; have a great affinity for water; and combine with acids, forming neutral salts, in which the qualities of both the components are lost. The discoveries of Sir H. Davy have clearly established that the greater number of them are compound bodies. They are affected by the air, and require to be preserved in well-stopped glass bottles.

NEUTRAL SALTS have neither acid nor alkaline properties; but salts are formed by the combination of acids with alkalies, in which the properties of the one or the other predominate; and consequently, although these are *secondary* salts, yet they cannot, in strict language, be denominated *neutral* salts. When the acid predominates, the salt is designated by the syllables *super* being added to the appellation of the neutral salt, formed with the same acid and alkali; but when the alkali is redundant, the syllable *sub* is added: thus, if to car-

¹ The words *Kali* and *Alkali* are of Persian origin, and derived from the terms  and , or *Kalia* and *Alkalia*, signifying the ashes of marine plants. Vide *Good's Nosology*, Prelim. Disc. p. xcv.

² The title of this section in the London Pharmacopœia is *Alkalies and their Salts*; but as these salts cannot be termed Salts of alkalies, in strict language, we prefer to translate the phrase *Neutral Salts*.

bonate of potash, be added a redundance of acid, it becomes a supercarbonate of potash; but if there be a deficiency of acid, the salt is a subcarbonate of potash; and as there are two varieties of acids formed from the combination of the same base or bases with different proportions of oxygen, so it has been found also necessary to distinguish the salts formed with them by different terminations: thus the salt composed of *sulphuric* acid and potash, is termed *sulphate* of potash, while that formed with *sulphurous* acid and the same alkaline base is termed *sulphite* of potash. When the acid has the term *oxy* prefixed to its name, the same syllables are prefixed to that of the salt thus *oxymuriate of potash*, denotes a salt composed of the oxymuriatic acid and potash.

The neutral and secondary salts have very different degrees of solubility; but that of almost all of them is increased by an augmented temperature, while their solution is for the most part accompanied with a diminution of temperature. They may be obtained unaltered from solutions by evaporation; and, if the process be slowly conducted, they form in regular crystallized masses, which have more or less transparency according to the quantity of water which they retain in their composition. Exposure to air, heat, and moisture, variously affect the appearance of crystallized salts. When they lose their transparency, and are covered with a white crust, or fall to powder, on simple exposure to the air, such salts are said to be *efflorescent*; if, on the contrary, they attract moisture from the atmosphere and become fluid, they are named *deliquescent*; and *permanent*, when the air has no effect on their crystals. The circumstance of a salt first melting in a moderate heat, then becoming covered with a white crust, and ultimately being converted into a dry opaque mass, is termed *watery fusion*; but when, instead of melting, it splits and the fragments fly off with a crackling noise, this effect is termed *decrepitation*.

The efflorescent and deliquescent salts should be preserved, and dispensed in well stopped bottles; while those that are permanent will not suffer from being put up in paper.

The alkalies have been employed as poisons; in which case the practitioner ought to be able to distinguish them from other acrid or caustic poisons. The volatile alkali is readily known by its odour; but if any of the fixed alkalies have been taken, besides the characters already enumerated, and which merely demonstrate the fact that the poison has been an alkali, the simplest method of ascertaining which of them it is, is to evaporate the solution, or some of the filtered fluid con-

tents of the stomach to dryness in a silver spoon or vessel; after which, by exposing the mass to the air, if the alkali be potash it will rapidly deliquesce, but it will remain dry if it be soda. Vinegar is the best antidote of the alkaline poisons, when given early enough after the poison has been swallowed.

AMMONIÆ SUBCARBONAS.¹ Lond. *Subcarbonate of Ammonia.*

“Take of muriate of ammonia, a pound; prepared chalk, dried, one pound and a half. Pulverize them separately; then mix them, and sublime with a gradually increased heat, until the retort becomes red hot.”

SUB-CARBONAS AMMONIÆ. Edin. *Carbonate of Ammonia.*

“Take of muriate of ammonia, one part; softer carbonate of lime, dried, two parts. Each being separately pulverized, mix them, and sublime from a retort into a receiver kept cold.”

Dublin.

“Take of muriate of ammonia, reduced to powder, and well dried, carbonate of soda, dried, each half a pound. Mix: then put them into an earthen retort, and sublime with a heat gradually increased, into a receiver kept cold.”

This salt is produced by a double decomposition of the substances employed. The lime of the chalk attracts the muriatic acid of the muriate of ammonia, while the carbonic acid is attracted by the ammonia. The muriate of lime which is formed remains in the retort, while the subcarbonate of ammonia sublimates and concretes into a cake on the sides of the receiver. The theory of the Dublin process, in which the carbonate of soda is ordered instead of chalk, is precisely the same, only less heat is required; but it is too expensive to be generally employed. The chalk, or the carbonate of soda, should be extremely well dried, and the ingredients very intimately mixed, that the decomposition may be as complete as possible. The retort should have a wide cylindrical neck; and the receiver have a nearly cylindrical form, to permit the concreted salt to be taken out without breaking the glass.²

Qualities. — Subcarbonate of ammonia has an ammoniacal pungent odour, and a slightly acrid, yet cooling taste. It is usually in a white semitransparent hard mass, which breaks with a striated fracture; has the specific gravity of 0.966³;

¹ *Ammonia preparata*, Sal cornu cervi, P. L. 1787. Carbonate d'ammoniaque (F.) Kohlensäures ammonium (G.) Sotto-carbonato d'ammoniacco (I.)

² This Salt is prepared, on a large scale, by sublimation from an iron pot, to which the heat is directly applied, and which is connected with a large earthen or leaden receiver. *Murray's System of Materia Medica*, ii, 228.

³ *Annales de Chimie*. xxviii. 12.

and is totally volatilized, when pure, in a moderate heat. It is insoluble in alcohol; is soluble in less than three parts of water at 60°, in an equal weight of warm water; but in the latter it effervesces and is partially decomposed. It changes the vegetable blues to green. Exposed to the air it gradually effloresces, and loses its pungent odour, owing either to the volatilization of the superabundant ammonia it contains, or to the absorption of carbonic acid from the air.¹

Bergman makes its constituents to be 45 parts of carbonic acid, 43 ammonia, and 12 water, — in 100 parts; but this statement has been shown to be erroneous; and I am inclined rather to adopt that of Mr. Phillips², who makes the proportions to be 50 carbonic acid, 39 ammonia, and 11 of water. Sir H. Davy, however, has found that the quantity of alkali varies according to the temperature that has been employed in the preparation: thus, when it is formed at a temperature of 300°, it contains rather more than 50 per cent. of ammonia; but at a temperature of 60, it contains only 20 per cent.

Subcarbonate of ammonia is decomposed by the acids, the fixed alkalies and their subcarbonates, barytes and lime, and partially by magnesia.

Medical properties and uses.—This salt is stimulant, antispasmodic, antacid, diaphoretic, and in large doses emetic. It is beneficially given in gout, hysteria, and dyspeptic affections, when much acid is present in the stomach; and in infantine convulsions connected with dentition, or with acidity of the primæ viæ. As a diaphoretic it is occasionally exhibited in chronic rheumatism, in combination with guaiacum; and sometimes, although rarely, it is employed to produce vomiting in gouty and paralytic cases. From the ammonia it contains in excess, the subcarbonate is applied as a local stimulant to the nostrils in syncope, hysteria, and languors; and with the addition of a little scent forms the common smelling salts of the shops. The ordinary dose is from grs. v. to grs. xx, formed into pills, or dissolved in any aqueous vehicle; but to excite vomiting ʒss may be given for a dose, and repeated, if necessary, assisting its operation by plentiful dilution.

Officinal preparations. *Liquor Ammoniae Subcarbonatis*. L. *Liquor Ammoniae Acetatis*. L. E. D. *Cuprum ammoniatum*. L. E. D. **LIQUOR AMMONIÆ**. Lond. *Solution of Ammonia*.

“Take of muriate of ammonia, eight ounces; lime newly burnt, six ounces; water four pints. Pour one pint of the

¹ The neutral carbonate is inodorous.

² Remarks on the *Editio Altera* of the

Pharm. Lond. p. 16.

³ *Aqua Ammoniae pura*, P. L. 1787. *Dissolution d'ammoniaque* (F.) *Atzendet Ammonium-liquor* (G.) *Liquore di Ammoniac* (I.)

water upon the lime, then cover the vessel, and set it aside for an hour. Dissolve the muriate of ammonia in the remainder of the water whilst boiling, add to it the former mixture, and again cover the vessel; after the liquor has become cold, strain it, and distil twelve fluid ounces of solution of ammonia.

The specific gravity of the solution of ammonia is to that of distilled water as 0.960 to 1.00.¹

AQUA AMMONIÆ. Edin. *Water of Ammonia.*

“Take of muriate of ammonia, *one pound*; lime newly burnt, *one pound and an half*; distilled water, *one pound*; water, *nine ounces*. Upon the lime broken to pieces pour the water in an iron or earthen vessel, cover it up, until the lime has fallen into powder and become cold, then rub the muriate to a fine powder, and triturate it with the lime in a mortar; after which put them directly into a bottle glass retort. Place the retort in a sand-bath, and adapt to it a receiver furnished with a tube passing into a phial containing distilled water: The phial, however, being sufficiently large to hold double the quantity of water. Then apply the fire, gradually raising it, until the bottom of the iron pot be red hot, and as long as gas and vapour are produced. The specific gravity of this solution of ammonia is to that of distilled water as 939 to 1000. It should be preserved in small phials well stopped.”

AQUA AMMONIÆ CAUSTICÆ. Dub. *Water of caustic Ammonia.*

“Take of muriate of ammonia, *sixteen ounces*; lime newly burnt, *two pounds*; water, *six pints*. Effuse one pint of water upon the lime placed in an earthen vessel, and cover it up. Twenty-four hours afterwards, when the lime is crumbled to powder, mix with it the salt, avoiding the vapours; then put the mixture into a retort, and pour upon it the remainder of the water. Agitate them; and having luted carefully the joinings of the vessels, distil with a moderate heat into a cooled receiver twenty-one measured ounces of the liquor. The specific gravity of this solution should be to that of distilled water as 934 to 1000.

In these processes, the lime having a superior affinity for muriatic acid, decomposes the muriate, from which the ammonia is disengaged, and passes over in combination with the watery vapour. If the temperature of the water rises to

¹ This process, which differs from that of the former edition of the Pharmacopœia, was suggested by Mr. Phillips; but more water is employed than he proposed, which he conceives to be objectionable; both because more fuel and larger vessels are required; and the total product is weaker in the proportion of about 9.5 to 13. Vide *Remarks in the Editio Altera of the Pharm. Lond.* p. 18.

130°, the ammonia is again separated in the form of gas; and hence the necessity of keeping the receivers cold. The product thus obtained is a saturated solution of ammonia; while muriate of lime remains in the retort, and may be dissolved out by twice its weight of water.

Qualities.—Liquid ammonia is a limpid colourless fluid. It has a very strong pungent odour, an extremely acrid taste, and inflames the skin. Obtained according to the London College, its specific gravity is .9060, to the Edinburgh .9039, while that of the Dublin College is .9310. The following table shows the strength of liquid ammonia of different degrees of specific gravity within a certain range: (Temp. 50° Fah. Pressure 29.8 Barom.)

100 parts Sp. Grav.	Contain of		100 parts Sp. Grav.	Contain of	
	Ammonia.	Water.		Ammonia.	Water.
.9000	26.00	74.00	.9513	12.40	87.60
.9054	25.37	74.63	.9545	11.56	88.44
.9166	22.07	77.93	.9573	10.82	89.18
.9255	19.54	80.46	.9597	10.17	89.83
.9326	17.52	82.48	.9619	9.60	90.40
.9335	15.88	84.12	.9684	9.50	90.50
.9435	14.53	85.47	.9639	9.09	90.91
.9476	13.46	86.54	.9713	7.17	92.83 ¹

For ordinary purposes it is useful to know, that a phial capable of containing 224 grains of distilled water can hold no more than 216 grains of the strong solution.

Liquid ammonia assists the oxidizement of copper and zinc; dissolves many of the metallic oxides; and unites with all the acids without effervescence, forming neutral salts. Its affinity for carbonic acid is so powerful, that it rapidly attracts it from the atmosphere; and hence the necessity of preserving it in well stopped small phials, as directed by the Edinburgh College. The acids, the metallic salts, and alum are incompatible in formulæ with it. The constituents of the ammonia it contains, according to the latest experiments of Mr. Davy, are 74 measures by bulk of hydrogen gas, and 26 of azotic gas; or, according to the analysis of Dr. Henry, 100 parts of ammonia consist of 80.36 of azote, and 19.64 hydrogen by weight.² The presence of carbonic acid in solution of ammonia may be readily detected by adding to it muriate of lime, which forms a precipitate if carbonic acid be present.

Medical properties and uses.—This solution of ammonia is

¹ Davy's Researches, p. 68.

² Philosophical Transactions, 1809.

stimulant, antacid, and rubefacient. It is usefully employed, when largely diluted, in paralysis, hysteria, and syncope; and is perhaps superior to all the other antacids in relieving cardialgia and other symptoms of acidity of the stomach. As a local stimulant it is applied to the nostrils in faintings; and a rag moistened with it, and laid over the scrobiculus cordis, sometimes raises an instantaneous blister, and, by merely inflaming the skin, always proves useful in spasms and gout in the stomach. Combined with a small portion of oil, it forms a saponaceous rubefacient, which is beneficially applied to the throat in inflammatory sore-throat, and as a friction in deep-seated inflammation and rheumatism. The dose of the solution is from mx to mxx in a large cupful of water or milk. When taken as a poison, if death be not the immediate result, the best antidote is vinegar.

Official preparations. *Hydro-sulphuretum Ammoniacæ*. E. D. *Oleum ammoniacum*. E. *Spiritus Ammoniacæ*. L. *Linimentum Ammoniacæ*. L. D. *Spiritus Ammoniacæ succinatus*. L.

AQUA AMMONIÆ DILUTA. Edin. *Diluted water of Ammonia*.

"Take of water of ammonia, *one part*; distilled water, *two parts*. Mix them together."

This preparation is probably intended for facilitating extemporaneous prescription; but as the solution of ammonia is never given except in a diluted form, it appears to be superfluous.

LIQUOR AMMONIÆ ACETATIS. Lond. *Solution of Acetate of Ammonia*.

"Take of subcarbonate of ammonia, *two ounces (diluted)*; acetic acid, *four pints*. Add the acid to the subcarbonate of ammonia, until the effervescence ceases."

AQUA ACETATIS AMMONIÆ; Edin. *Water of Acetate of Ammonia*.

"Take of carbonate of ammonia in powder, *any quantity*. Pour upon it as much weak acetic acid as will exactly saturate the ammonia."

Dublin.

"Take of carbonate of ammonia, *two ounces*. Add by small portions, with frequent agitation, *three pints and a half* of distilled vinegar, or as much as will saturate the ammonia, which may be ascertained by means of litmus."

The subcarbonate of ammonia employed for this preparation, is decomposed by the acetic acid of the distilled vinegar; which, combining with the ammonia, forms an acetate that remains dissolved in the water, while the disengaged carbo-

¹ *Aqua Ammoniacæ Acetatae*, P. L. 1787. *Acetate d'ammoniaque liquide* (F.) *Essigsaures Ammonium liquor* (G.) *Liquore di Minderero* (I.)

nic acid flies off in the form of gas, exciting effervescence. In our experiments, distilled vinegar of a specific gravity of 1007 required 320 grains of the subcarbonate to saturate a pint; hence the proportion ordered by the London and Dublin Colleges is just sufficient for saturating three pints.¹ Owing, however, to the variable proportion of acid in distilled vinegar, this preparation cannot be obtained of an uniform strength; and provided it be accurately neutralized it is of little importance. If it be not accurately saturated, some of the metallic salts, particularly those of antimony, which are often ordered in conjunction with it, are decomposed.²

Qualities. — This solution is inodorous; has a slightly nauseous taste; and, when made with pure materials, is limpid and colourless. It is decomposed by the fixed alkalies, the strong acids, oxymuriate of mercury, and nitrate of silver, which are consequently incompatible in formulæ with it.

Medical properties and uses. — As a diaphoretic it is in common use in febrile diseases; and may be combined with opium, camphor, antimonials, or nitrate of potash. It is necessary to assist its determination to the skin with plentiful dilution, and a moderate degree of external heat: for by free exposure to cool air it excites the kidneys, instead of opening the skin. Externally it is employed as a discutient; as a lotion to inflamed surfaces; and when diluted with rose-water holding in solution a small portion of opium, it is an excellent collyrium in chronic ophthalmia; and still more largely diluted, is occasionally used as an injection in the commencement of gonorrhœa. The ordinary dose is from fʒij to fʒxij, given every three or four hours.

LIQUOR AMMONIÆ SUBCARBONATIS.³ Lond.
*Solution of Subcarbonate of Ammonia.*⁴

“Take of subcarbonate of ammonia, *four ounces*; distilled water, *a pint*. Dissolve the subcarbonate of ammonia in the water, and filter through paper.”

SOLUTIO SUBCARBONATIS AMMONIÆ. Edin. *Solution of Carbonate of Ammonia.*

“Take of subcarbonate of ammonia, *one part*; distilled

¹ The mercury of a thermometer, the bulb of which was immersed in the solution while effervescing, sunk five degrees.

² M. de Lussone obtained the salt crystallized by sublimation, in long slender flatted crystals, terminating in sharp points, an inch in length, and of a pearl-white colour. They are very deliquescent; impress on the tongue a sense of coldness and sweetness; melt at 170°, and sublime at about 250°. According to Richter, they consist of 68.77 acid, and 31.23. base. *Thomson's Chemistry*, 4th ed. vii. 62.

³ Soucarbonate d'ammoniaque (F.) Kohlensaures Amonium liquor (G.) Liquore Sotto-carbonato di ammoniaco (I.)

⁴ Remarks on the *Editio Altera* of the *Pharm. Lond.* p. 16.

water, *four parts*. Dissolve the subcarbonate in the water, and filter through part."

AQUA CARBONATIS AMMONIÆ. Dub. *Water of Carbonate of Ammonia*.

"Take of muriate of ammonia, *a pound*; carbonate of soda, *twenty-eight ounces*; water, *three pints*. Distil off two pints, with a fire gradually raised. The specific gravity of this liquor is, to that of distilled water, as 1095 to 1000."

The formulæ of the London and the Edinburgh Colleges for this preparation are to be preferred, inasmuch as they obtain by simple solution the same result as is produced from the more complicated process of the other College. The theory of the Dublin process is the same as that of the preceding preparation. The soda of the alkali employed, unites with the muriatic acid of the muriate, while the ammonia combines with the carbonic acid, and the subcarbonate of ammonia thus formed is volatilized, and carried over with the watery vapour.

Qualities.—This solution has the odour and taste of the concrete subcarbonate; is limpid and colourless; and when shaken with twice its bulk of alcohol, a nearly uniform coagulum is formed. Its specific gravity should be 1150.

Medical properties and uses.—The same as those of the concrete salt. It is given in doses of from fʒfs to fʒj in any bland fluid.

LIQUOR VOLATILIS CORNU CERVINI.¹ Dub. *Volatile Liquor of Hartshorn*.

"Take of hartshorn, *any quantity*; put it into a retort, and distil with a gradually raised heat, a volatile liquor, a salt, and an oil; then repeat the distillation of the volatile liquor until it becomes as limpid as water, separating, after each distillation, the oil and salt by filtration. The liquor will be more easily purified, if, after each distillation, except the first, there be added to it one-sixth part of its weight of charcoal, previously made red hot, then extinguished by covering it with sand, and powdered while hot. If a sufficient quantity of hartshorn cannot be procured, the bones of any land animals may supply its place."

In this process the gelatine of the horns, or the bones, is decomposed, and its ultimate principles, which are carbon, nitrogen (*azote*), hydrogen, and oxygen, entering into new combinations, form subcarbonate of ammonia, empyreumatic oil, and water, which are the products of the process. The subcarbonate is obtained partly in a solid form, and partly

¹ Alkali volatil fluor (F.) Wässriger Kohlensaures Ammonium liquor (G.) Liqueur dis corno di Cervo (I.)

dissolved in the water, which distils over; but in both states it is contaminated with the empyreumatic oil. The subsequent distillations are intended to free it from this oil; which, although at one time it was supposed to add to the efficacy of the remedy, yet is now conceived to be useless, and a disadvantage: nevertheless, when it is completely removed by the charcoal, this preparation does not differ from a simple solution of the subcarbonate in water.

The volatile liquor of hartshorn found in the shops is part of the product of the distillation of bones on a great scale; and is never completely free from the empyreumatic oil, which is very perceptible in its odour and taste, and gives it a slight yellow tinge. It is often adulterated by the addition of a considerable portion of water; and this cannot be known by its pungency, which is kept up by adding to it a small quantity of liquor ammoniæ. The fraud, however, may be detected by mixing a small portion of the suspected liquor with twice its bulk of alcohol; when, if no considerable quantity of salt is precipitated, it is certainly adulterated.

LIQUOR POTASSÆ. Lond. *Solution of Potash.*¹

“Take of subcarbonate of potash, *a pound*; lime fresh burnt, *half a pound*; boiling distilled water, *a gallon*. Dissolve the subcarbonate of potash in two pints of the water. Add the remainder of the water to the lime, mix the hot liquors together, then set the mixture aside in a covered vessel, and when it is cold, let it be strained through a cotton bag. If, on the addition of any diluted acid, effervescence be excited, more lime must be added, and the filtration repeated. A pint of this solution ought to weigh sixteen ounces.”

AQUA POTASSÆ. Edin. *Water of Potash.*

“Take of lime fresh burnt, *eight ounces*; subcarbonate of potash, *six ounces*; boiling water, *twenty-eight ounces*. Let the lime be put into an iron or earthen vessel, with twenty ounces of the water. When the ebullition ceases, immediately add the salt, dissolved in the remaining eight ounces of the water; and having thoroughly mixed the whole, cover the vessel till they cool. The mixture being cooled, agitate it well, and pour it into a glass funnel, the tube of which is obstructed with a piece of clean linen. Cover the upper orifice of the funnel while its tube is inserted into another glass vessel, that the solution of potash may gradually drop through the linen into the lower vessel. When it first ceases to drop, pour a few ounces of water into the funnel, but cautiously, so that the fluid may swim above the matter. The water of potash will again begin to drop. The affusion of water, however, must be repeated

¹ Aqua Kali Puri, P. L. 1787. Dissolution de Potasse (F.) Flüssiges ätzendes Kali (G.) Liquore di Potassa (I.)

until three pounds have filtered, which will be in the space of two or three days; then let the upper parts of the solution be mixed with the lower by agitation, and preserve it in a well stoppt vessel.

AQUA KALI CAUSTICA. Dub. *Water of Caustic Kali.*

“Take of lime fresh burnt, *eight ounces*; subcarbonate of kali, *six ounces*. Pour upon the lime put into an earthen vessel, two pints of boiling water; and when slacked, mix with it the salt, and cover the vessel. Pour the materials, as soon as they are cold, into a glass funnel, the tube of which is obstructed with a linen rag. Cover the funnel, and allow the lixivium to drop into a vessel placed below it, pouring water into the funnel occasionally, until three pounds have filtered. Let the solution be shaken, and preserved in a well-stoppt green glass bottle.

“If the ley be rightly prepared it will be colourless, inodorous, and will scarcely effervesce when mixed with an acid. If it effervesce considerably, let a small portion of fresh burnt lime, in fine powder, be added; digest for twenty-four hours in a covered vessel, frequently agitating; and finally, filter the ley in the manner already directed.

“The specific gravity of this solution is, to that of distilled water, as 1100 to 1000.”

In considering the proportions of the two latter of these processes, there appears, *a priori*, a much larger proportion of lime ordered than is necessary for the decomposition of the subcarbonate of potash; but if the theory of Berthollet¹, as to the effect of quantity in influencing chemical affinities, be just, this superabundance is necessary to insure the more perfect separation of the carbonic acid from the potash. If the lime, however, be well burnt, and recent, the solution is obtained almost perfectly free from carbonic acid, by the quantity ordered in the London formula; but, unless much care be taken to exclude the air during the filtration, it will be rapidly attracted from the atmosphere. Calico is the best substance for stopping the mouth of the funnel, and it should be supported on a rough pebble or siliceous stone, previously dropped into the funnel, and allowed to settle itself. It should be kept in small glass bottles, fitted with ground stoppers.

Qualities.—Solution of potash is inodorous, and so caustic as not to admit of being tasted. It is limpid, colourless, dense, and has an oily appearance when agitated; does not effervesce with acids, nor afford a precipitate with lime-water; and feels soapy when rubbed between the fingers, owing to the solution of the cuticle. When perfectly pure, it remains transparent

¹ *Chemical Statics*, vol. i.

on the addition of barytic water. Prepared according to the formulæ of the pharmacopœias, it is not a simple solution of potash, but contains small portions of muriate, and sulphate of potash, silica, and generally some lime¹; but these contaminations do not alter its effects as a remedy, nor as a pharmaceutical agent.

Medical properties and uses.—This solution is diuretic, antacid, and lithroniptic. The two first properties it certainly possesses in a considerable degree; but its continued use, even when much diluted, is said to debilitate, and otherwise injure the stomach. As a solvent of calculus, both in the kidneys and bladder, this alkali has long been celebrated: it acts, however, on calculi composed of uric acid, or of urate of ammonia, only; and although its continued use certainly renders the urine alkaline, yet there is reason to believe that its solvent effects on these calculi in the bladder are not equivalent to the irritation it excites both in the stomach and bladder; and as a prophylactic, its place can be much better supplied by magnesia and the alkaline carbonates. Dr. Willan says, he has seen the most beneficial effects experienced from the internal use of this solution in lepra.² It is also used as a local stimulant, much diluted, in the form of lotion, to the joints, in rachitis and gouty swellings; and in its concentrated state, as a caustic, to destroy the poison introduced by the bite of rabid or venomous animals.

The dose of this solution may be from $\text{m} \times$ to $\text{f}3\text{ss}$, taken in chicken-broth, milk, or almond mixture; or, in cases of acidity of the stomach, in some bitter infusion.

Official preparations. *Potassa fusa*. L. E. D. *Potassa cum Calce*. L. E. D. *Liquor Sulphureti Kali*. D. *Antimonii Sulphuretum præcipitatum*. L. E.

LIQUOR POTASSÆ SUBCARBONATIS. Lond. *Solution of Subcarbonate of Potash*.³

“Take of subcarbonate of potass, a pound; distilled water, twelve fluid ounces. Dissolve the subcarbonate of potash in the water, and filter the solution through paper.”

AQUA SUBCARBONATIS KALI. Dub. *Water of Subcarbonate of Kali*.

“Take of subcarbonate of kali, any quantity; let it be put into a wide-mouthed glass funnel, the neck of which is ob-

¹ The presence of muriates may be discovered by saturating a portion of the solution with nitric acid, then adding nitrate of barytes to precipitate the sulphates, if any; and lastly, adding a solution of nitrate of silver, which is precipitated if any muriate be present. Sulphates are discovered by saturating with muriatic acid, and adding muriate of barytes; and if lime be present, blowing into the solution through a tube will render it turbid.

² Willan on Cutaneous Diseases, p. 141. ³ *Aq. Kali præparatum*, P. L. 1787. *Dissolution de soucarbonate de Potasse* (F.) *Flüssiges Kohlensaures Kali* (G.) *Liquore di Sotto carbonato di Potassa* (I.)

structed with a piece of linen; then set it in a cellar that the moist air may liquefy the salt. Let the ley or solution be received into a vessel placed under it."

Of these two formulæ, that of the London Collegè is to be preferred, as it affords the preparation with greater facility, and always of a definite strength. The bulk of the fluid is increased rather more than one third part. In the Dublin preparation, from the length of time which is required, the deliquescent salt attracts carbonic acid from the air, and becomes nearly a neutral carbonate.

Qualities. This solution should be perfectly clear, colourless, and inodorous; and possess the properties of the subcarbonate from which it is prepared. It cannot enter into extemporaneous formulæ with vegetable infusions containing much tannin, or with lime-water, magnesia, sulphate of magnesia, or the metallic salts; as these substances decompose it, or are decomposed by it.

Medical properties and uses.—These are the same as those of the concrete salt. The dose may be from $\mathfrak{m}\text{x}$ to $\mathfrak{f}\mathfrak{z}\mathfrak{j}$, in any convenient vehicle.

POTASSA CUM CALCE. Lond. *Potash with Lime.*¹

"Take of solution of potash, *three pints*; lime, fresh burnt, *a pound*. Boil the solution of potash down to a pint, then add the lime, previously slaked by the water, and intimately mix them."

POTASSA CUM CALCE; olim, CAUSTICUM COMMUNE MITIUS. Edin. *Potash with Lime*; formerly, *Milder common Caustic*.

"Take of the water of potash, *any quantity*. Evaporate it to one third part in a covered iron vessel: then mix with it as much newly slaked lime as will bring it to the consistence of a solid paste, which is to be preserved in a well stopt vessel."

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

"Evaporate water of caustic kali to one third part; then add as much fresh burnt lime in powder as will form a mass of a proper thickness, which is to be preserved in a well-stopt bottle."

The addition of the lime in these preparations renders the potash less deliquescent, and consequently more manageable as an escharotic.

POTASSA FUSA. Lond. *Fused Potash.*²

"Take of solution of potash, *a gallon*. Evaporate the water in a clean iron vessel over the fire, until the ebullition

¹ *Calx e Kali Puro*, P. L. 1778.

² *Kali Purum*, P. L. 1787. *Potasse fondue* (F.) Trocknes ätzendes Kali (G.) Pietra caustica (L.)

having ceased, the potash melts, and then pour it out upon a clean iron plate into proper forms."

POTASSA; olim, CAUSTICUM COMMUNE ACERRIMUM. Edin. Potash; formerly, *Stronger common Caustic*.

"Take of solution of potash, *any quantity*. Evaporate in a covered very clean iron vessel, until, the ebullition being over, the saline matter flows smoothly like oil, which happens before the vessel becomes red hot. Then pour it out upon a clean iron plate; cut it into small masses before it hardens, and let it be preserved in well-stopt phials.

KALI CAUSTICUM. Dub. *Caustic Kali*.

"Take of solution of caustic kali, *any quantity*. Evaporate it over the fire in a clean iron vessel, until, the ebullition having ceased, the saline matter, on increasing the heat, remain almost quiescent in the vessel. Pour out the melted salt upon a clean iron plate; and while it is concreting, let it be cut into proper pieces, which must be immediately put into a phial closely stopt. During the evaporation the operator must avoid the drops which may be thrown out from the vessel."

The concrete potash procured by these processes is sufficiently pure for medical purposes, but it still contains the same foreign ingredients as the solution. To procure it as free as possible from carbonic acid, the evaporation should be performed very quickly, and in a deep vessel, so that the watery vapour which rises may exclude the atmospheric air. It is generally run into moulds, which form it into solid cylinders, which are covered with paper, and kept in well stopt bottles. The method of Berthollet¹ for obtaining it in perfect purity, which is usually described in chemical and pharmaceutical works, is too troublesome and expensive to be generally adopted. The following method proposed by Lowitz is more economical.

A solution of potash must be evaporated till a pellicle forms on its surface, then allowed to cool; and the saline deposit, which consists chiefly of the foreign salts, carefully separated. The evaporation is then to be renewed, skimming off the pellicles that form on the surface of the fluid, which, as soon as these cease to be produced, and the ebullition is ended, must be removed from the fire, and constantly stirred till it is cold. The mass is next to be dissolved in twice its weight of distilled cold water, the solution filtered, and evaporated in a clean iron or silver basin² until crystals are deposited. If the heated fluid consolidates into a mass, in any degree, a small portion of water

¹ *Journal de Physique*, xxviii. 402.

² Lowitz orders the evaporation to be performed in a glass retort; but pure potash, when hot, dissolves glass.

must be added, and the mass again heated to fluidity. The supernatant liquor is left of a brown colour, which, after being kept for some time at rest in well-stopt phials, deposits the colouring matter, and may be again evaporated and crystallized as before. The crystals obtained in the various evaporations are colourless pure potash.¹

Qualities.—Concrete potash is a white brittle substance, having the peculiar odour of slacking quick-lime, and a degree of causticity which prevents it from being tasted. It attracts water rapidly from the atmosphere, and is completely soluble in less than its own weight of that fluid at 60°. When heated to 360° it melts, and at a red heat heat is volatilized. It unites with sulphur, the acids, many of the metallic oxides, and the fixed oils. Its constituents, according to the analysis of Sir H. Davy, who first ascertained its compound nature, are, in 100 parts, 86 of a metal which has been named potassium, and 14 of oxygen.²

Medical properties and uses.—Concrete potash is used only as an escharotic, for forming issues in diseases of the hip joint, the spine, and in deep-seated inflammations. It erodes the skin and soft parts beneath it to a certain extent, destroying the life of the part, which is subsequently thrown off as a slough, and an ulcer is left. To prevent inconvenience from its deliquescent nature, the skin should be covered with a piece of calico, spread with adhesive plaster, and having a hole in its centre sufficient to bare the part only where it is intended to apply the caustic. It has lately been much recommended for the removal of strictures of the urethra.

POTASSÆ ACETAS. Lond. *Acetate of Potash.*³

“Take of subcarbonate of potash, *a pound and a half*; (*diluted*) acetic acid, *a gallon*. Mix them together in a large glass vessel; and having evaporated the solution to one half over the fire, add gradually as much more (*diluted*) acetic acid as may be required for perfect saturation. Let the solution be again evaporated to one half, and strained; then let the evaporation be continued in a water-bath, so that, on being removed from the fire, crystals shall form.”

ACETAS POTASSÆ. Edin. *Acetate of Potash.*

“Take of very pure carbonate of potash *one pound*; weak acetic acid, *a sufficient quantity*. Boil the subcarbonate in five pounds of the acid; and add more acid at different times, until the watery part of the former portion being nearly dissipated by evaporation, the acid newly added occasions no effervescence, which will be the case when about twenty pounds of acid have

¹ *Nicholson's Journal*, 4to, i. 164.

² *Phil. Trans.* 1808.

³ *Kali acetatum*, P. L. 1787. *Acetate de Potasse* (F.) *Essigsaures Kali* (G.) *Acetato di Potassa* (I.)

been consumed; then evaporate slowly to dryness. Liquefy this impure salt with a gentle heat for a short time; then let it be dissolved in water, and filtered through paper. If the liquefaction has been properly performed, the filtered fluid will be limpid; but otherwise, of a brown colour. Afterwards evaporate this fluid in a shallow glass vessel, so that when removed from the fire, it may pass into a crystalline mass. Finally, the acetate of potash ought to be preserved in closely shut vessels."

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 moderately heated. When the effervescence shall have ceased, and the fluid is somewhat evaporated, add, at intervals, more distilled vinegar, until the mixture entirely cease to effervesce: then evaporate to dryness, and having raised the fire a little, cautiously liquefy the mass. Dissolve the salt in water after it is cold; filter the solution, and let it be boiled, until, on being removed from the fire, it concretes into a crystalline mass, which should be very white. Put this mass, at the moment, into closely stopped bottles."

In these processes, the acetic acid of the distilled vinegar combines with the potash of the subcarbonate, and expels the carbonate acid in a gaseous form, exciting effervescence. Owing to the largely diluted state of the acid in distilled vinegar, a considerable quantity, nearly three times more than is ordered by the London College, is required to saturate the potash. Towards the point of saturation, the solution acquires a reddish-brown colour, and during the evaporation a quantity of carbonaceous matter is deposited, arising from the distilled vinegar, retaining some of the extractive of the common vinegar; or if the liquor be evaporated to dryness, a brownish-coloured salt is obtained. The filtering the evaporated fluid, or fusing the salt, and keeping it for a little time fluid, then dissolving it in water, and filtering it, frees it almost entirely from colour, and a light carbonaceous matter remains on the filter. The filtered solution is nearly limpid and colourless; and when again evaporated forms a nearly colourless salt.¹ It is rendered still more colourless, if a portion of animal charcoal be added to the solution.²

This salt may also be prepared with the residue after the

¹ A very pure and beautiful salt, but too expensive for common use, may be prepared by adding to a solution of two parts of superacetate of lead, a solution of one part of subcarbonate of potash, and after filtering the liquor, adding to it a small portion of sulphate of potash, and filtering again before evaporation. Vide *Journ. de Pharm. Maii*, 1818. p 203.

² *Ann. de Chim.* vol. lxxvi. p. 44.

distillation of vinegar; but the process is not more economical than when distilled vinegar is used.

Qualities. — Acetate of potash has a slight peculiar odour, and a warm sharp taste. It is usually in white masses, of a foliated soft texture, shining, and becoming soon moist if exposed to the air. One fluid ounce of distilled water at 60° dissolves 504 grains; or 100 parts of it are soluble in 105 parts of water, and in twice its weight of alcohol. It is sometimes adulterated with tartrate of potash, which may be detected by adding to a solution of the salt a solution of tartaric acid, which, if tartrate of potash be present, will occasion a copious precipitate. The same adulteration may be detected by the acetate of lead forming a precipitate, soluble in acetic acid. In the watery solution it is spontaneously decomposed; and is also decomposed by the strong acids; by a decoction of tamarinds; the sulphates of soda and of magnesia; the muriate of ammonia; the tartrate of potash and soda; and by solutions of oxy-muriate of mercury, and of the nitrate of silver: which consequently cannot enter into formulæ with it.

Its constituents, according to the experiments of Dr. Higgins, are 38.5 of acid, and 61.5 of alkali—in 100 parts.¹

Medical properties and uses. — Acetate of potash is mildly cathartic and diuretic. It is found to be occasionally beneficial in febrile affections and jaundice; but its principal use is in dropsies, and other diseases in which a copious discharge of urine is required. To produce the latter effect, the dose may be from ʒj to ʒj, given every three or four hours, in any bland fluid. Doses of ʒij or ʒiij open the bowels.

Official preparations. *Acetas Hydrargyri*. E. D. *Tinctura Acetatis Ferri*. D. *Acidum aceticum*.

POTASSÆ CARBONAS. Lond.* *Carbonate of Potash.*

“Take of subcarbonate of potash prepared from tartar, a pound; sub-carbonate of ammonia, three ounces; distilled water, a pint. To the solution of the potash in the water, add the carbonate of ammonia; next expose it in a sand-bath to a heat of 180° for three hours, or until the ammonia be expelled, and then set it aside to crystallize. Let the residuary fluid be evaporated in a similar manner, so that when set aside it may again afford crystals.”

CARBONAS POTASSÆ. Edin. *Carbonate of Potash.*

“Take of pure subcarbonate of potash, two parts; water three parts. Dissolve the salt in the water, and by means of a proper apparatus, throw into it a stream of carbonic acid gas. Filter the solution, when it ceases to absorb the acid, and then

¹ Higgins on Acetous Acid, p. 8.

² Carbonate de Potasse (F.) Kohlensaures Kali (G.) Carbonato di Potassa (I.)

evaporate it by a heat not exceeding 180° , that crystals may form. The carbonic acid is easily obtained by pouring diluted sulphuric acid on pulverized carbonate of lime."

In the London process, which was first proposed by Bergman¹, the degree of heat employed aids the superior affinity of the potash for carbonic acid, while it weakens that of the ammonia, which therefore parts with the portion it contains to the subcarbonate of potash, and is itself volatilized. By following the directions of the formula it is an expensive process, unless the mixture be made in a retort, and a receiver containing a small portion of distilled water be adapted, so as to condense the pure ammonia which is volatilized: but in either way some of the ammonia still remains unexpelled; and the quantity ordered is not sufficient for yielding enough of the acid to fully saturate the potash. A purer and more completely neutralized carbonate of potash is obtained with equal facility by the Edinburgh process.² When prepared in this manner, any silex the subcarbonate may have contained, is completely separated.

Qualities.—This salt prepared by these formulæ, is, properly speaking, a bicarbonate. It has a slightly alkaline taste, without any acrimony. It is in small tetrahedral rhomboidal prisms, with dihedral summits, of a beautiful white colour, not altered by exposure to the air, soluble in four parts of water at 60° , and $\frac{1}{2}$ ths of their weight of boiling water, in which they are partially decomposed, carbonic acid gas being emitted during the solution. It still changes to green the vegetable blues, and is therefore in strict language not a carbonate. Its constituents, according to Pelletier, are 43 acid, 41 of alkali, and 16 of water—in 100 parts.³

Medical properties and uses.—On account of the increased quantity of carbonic acid which this salt contains, it is preferable to the common subcarbonate for effervescing draughts; but does not differ from it in its properties as a remedy.

POTASSÆ SUBCARBONAS. Lond. *Subcarbonate of Potash.*⁴

"Take of impure potash (*pearl-ashes*), reduced to powder, three pounds; boiling water, three pints and a half. Dissolve the potash in the water, and filter; then pour the solution into

¹ *Opusc.* i. 13.

² Another method is recommended by Curadon: "He dissolves the potash in a sufficient quantity of boiling water, mixes it with as much tanner's 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 permanent crystals of carbonate of potash." *Edin. New Dispensatory*, 452.

³ *Ann. de Chim.* t. xv. p. 33.

⁴ *Kali præparatum*, P. L. 1787. *Soucarbonate de Potasse* (F.) *Kohlensaures Kali* (G.) *Sotto-carbonato di Potassa* (I.)

a clean iron pot, and evaporate the water with a gentle heat until the liquor thickens; lastly withdraw the fire, and stir assiduously with an iron spatula, until the salt concretes into small grains."

"A purer subcarbonate of potash may be prepared in a similar manner from Tartar, previously burnt until it is of an ash colour."

SUBCARBONAS POTASSÆ. Edin. *Sub-carbonate of Potash.*

"Let impure carbonate of potash be put into a crucible and exposed to a red heat. Then triturate it with an equal weight of water. Pour the solution, after the impurities have subsided, into a clean iron pot, and boil it to dryness; stirring the salt constantly towards the end of the boiling, to prevent it from adhering to the vessel."

SUBCARBONAS KALI. Dub. *Subcarbonate of Kali.*

"Take of potashes coarsely powdered, cold water, each six pounds. Mix them by trituration, and macerate them in a wide vessel for the space of a week, with frequent agitation; then filter the solution, and evaporate it to dryness; and towards the end of the process assiduously stir the saline mass with an iron spatula. In this manner having reduced it to a coarse powder, preserve it in well stopt vessels. Previous to dissolving the ashes in the water, if they be very impure, roast them in a crucible until they become white."

The potash of commerce is a heterogeneous mass, consisting chiefly of subcarbonate of potash, with small portions of sulphate of potash, muriate of potash, siliceous earth, oxide of iron, and oxide of manganese, in various proportions. (See Part ii. p. 318.) The above processes are intended to separate the subcarbonate of potash in as pure a state as possible; and by following the directions of any of the pharmacopœias, it is obtained sufficiently pure for medicinal purposes; while the insoluble metallic salts, and the greater part of the siliceous earth, are left on the filter when the solution is strained. It may be obtained in a still purer state by evaporating the solution till a pellicle forms on the surface, and allowing it to stand for some hours, in order that the muriate of potash and the sulphate of potash may be crystallized and separated; after which the solution of the subcarbonate can be evaporated, and treated as above.

Qualities.—The salt obtained by the above processes is a subcarbonate in coarse white grains, which, owing to the excess of alkali, are so deliquescent, that they soon attract from the air as much water as dissolves them; and hence the salt must be kept in well stopt bottles. Its taste is acrid and urinous; it changes to green the vegetable blue and red colours, combines with oils, and forms soaps, and is decomposed

by acids with effervescence. Its constituents, according to Kirwan, are, in 100 parts, 60 of potash, 28 or 30 of carbonic acid, 6 of water, and the remainder sulphate of potash, muriate of potash, siliceous earth, and argil.¹

SUBCARBONAS POTASSÆ PURISSIMUS.² Edin.
Pure Subcarbonate of Potash.

“Take of impure supertartrite of potash, *any quantity*. Wrap it up in moist bibulous paper, or put it into a crucible; and having placed it among live coals, let it be burnt to a black mass; which, after having reduced it to powder, expose in an open crucible to a moderate fire, until it become white, or at least ash-coloured, taking care that it be not melted. Then dissolve it in warm water; strain the solution through a linen cloth, and evaporate it in a clean iron vessel, stirring constantly towards the end of the process with an iron spoon, lest any of it should adhere 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 red hot. Finally, when it is cold, let it be preserved in well stopt glass vessels.”

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

“Take of crystals of tartar, *any quantity*. Heat it to redness in a silver crucible lightly covered, until fumes cease to be emitted. Let the residue be reduced to a coarse powder, and in the same crucible left uncovered, roast it for two hours, stirring it frequently. Then boil it in twice its weight of water, during a quarter of an hour; and after due subsidence of the impurities, pour off the pure solution. Let this part of the process be three times repeated. Filter the mixed leys, and evaporate them in a silver vessel; then, while the residuary salt is drying, granulate it by brisk agitation, and expose it to an obscure red heat. Take it out of the vessel before it be quite cold, and let it be preserved in well stopped phials.”

The product of these processes is a subcarbonate of potash. The degree of heat to which the crude supertartrate is exposed decomposes its tartaric acid; and by the re-union of two of its components, oxygen and carbon, carbonic acid is formed, which combines with the potash, while the remaining carbonaceous matter produced by the decomposition is burnt out by the subsequent roasting. The resulting saline mass, besides subcarbonate of potash, contains also a small portion of carbonate of lime and some argil, which however are separated by the solution and filtration.

Qualities. — These are in every respect the same as those of the salt obtained from the potashes of commerce; it, however, contains fewer impurities. Its constituents, according

¹ *Nicholson's Journal*, 4to. iii. 215.

² Soucarbonate de Potasse (F.) Sotto carbonato di Potassa (I.)

to Berard, are 29·79 acid, and 70·21 alkali and water, in 100 parts.¹

Subcarbonate of potash is often adulterated, or very carelessly prepared. If one part of it be dissolved in eight parts of distilled water and saturated with pure nitric acid, the presence of siliceous earth will be indicated by the solution becoming turbid, and by weighing the precipitate its quantity may be ascertained. A precipitate being formed on the addition of muriate of barytes indicates the presence of sulphates; a white precipitate turning blueish on exposure to the light, on adding nitrate of silver, proves the presence of muriatic salts; and calcareous earth is rendered evident by dropping into a solution of the subcarbonate a few drops of a solution of oxalic acid or oxalate of ammonia.

Medical properties and uses.—Subcarbonate of potash is deobstruent, diuretic, and antacid. In small doses, it is sometimes given in cases of glandular obstructions of the abdominal viscera, particularly hepatic obstructions, with seeming advantage; but it is not certain that the benefit does not arise from the effects of the remedy in correcting acidity of the primæ viæ. Its effects on the kidneys are considerable, when aided by plentiful dilution. The principal use, however, of this salt in medicine, is for the formation of saline draughts, for which purpose it is given in combination with a solution of citric acid, or with recent lemon juice, in the proportion of ʒj of the salt to fʒiv of the lemon juice, or the acid solution, in febrile affections. When given as an antacid, its taste and acrimony are most perfectly covered with milk.

Official preparations. *Aqua Supercarbonatis Potassæ*. E. *Potassæ Acetas*. L. E. D. *Potassæ Carbonas*. L. *Potassæ Tartras*. L. E. D. *Liquor Potassæ*. L. E. D. *Liquor Potassæ Subcarbonatis*. L. D. *Sulphas Potassæ*. E. *Magnesicæ Carbonas*, L. D. *Potassæ Sulphuretum*. L. E. D. *Liquor arsenicalis*, L. *Sulphur antimoniatum fuscum*. D. *Alcohol*. L.

POTASSÆ SULPHAS. Lond. *Sulphate of Potash*.²

“Take of the salt which remains after the distillation of the nitric acid, *two pounds*; boiling water, *two gallons*. Mix them so as to dissolve the salt; and then add as much subcarbonate of potash as may be sufficient to saturate the acid. Next boil till a pellicle forms on the surface, and after filtering the liquor, set it aside to crystallize. Pour off the water, and dry the crystals on bibulous paper.”

¹ *Annales de Chimie*, lxxi. 55.

² This name was imposed by the French chemists in 1787. The following are some of its old names: *Nitrum fixum*, *arcanum duplicatum*, *sal de duobus*, *sal polychrestus*, *tartarum vitriolatum*, *kali vitriolatum*.—Syn. *Sulfate de Potasse* (F.) *Schwefelsaures Kali* (G.) *Solfato di Potassa* (I.)

SULPHAS POTASSÆ. Edin. *Sulphate of Potash.*

"Dissolve the acidulous salt, which remains after the distillation of nitrous acid, in hot water, and add as much carbonate of lime in powder, as will saturate the superfluous acid, and leave the whole at rest, until the fæces subside. Having poured off the fluid, filter it through paper, and evaporate until crystals form."

SULPHAS KALI. Dub. *Sulphate of Kali.*

"Dissolve the salt which remains after the distillation of nitric acid, reduced to a powder, in a sufficient quantity of warm water. Add as much potash as will saturate the superfluous acid. Let the filtered solution be evaporated with a gentle heat, that crystals may be formed."

In these preparations, the subcarbonate of potash, and the carbonate of lime, which are added to the solution of the salt, combines with the superfluous sulphuric acid, while its carbonic acid is expelled; and the whole of the residue is thus converted into sulphate of potash. Both the London and the Dublin formulæ are objectionable on the score of expense; the value of the salt, as obtained by the London process, at the price of the pure salt made on the large scale, being to its cost very nearly as 5 to 10.¹ The greater part of the sulphate of commerce is prepared from the residue of the distillation of nitrous acid from nitre and sulphate of iron. This is a mixture of sulphate of potash and red oxide of iron, from which the sulphate is easily separated by boiling water, while the oxide remains undissolved.²

Qualities.—Sulphate of potash has a nauseous bitterish taste. It is usually procured in small, grouped, transparent crystals, of which the primitive form is a pyramidal dodecahedron, with isosceles triangular faces³; but this form is subject to various modifications, according to the mode of conducting the evaporation. Their specific gravity is 2.4073.⁴ They are scarcely efflorescent; decrepitate when heated; and are soluble in 16 parts of water at 60°, and 5 parts of boiling water. This salt is partially decomposed by the nitric and muriatic acids; and in solution is completely decomposed by muriate of barytes, muriate of lime, lime-water, oxy muriate of mercury, nitrate of silver, and acetate and superacetate of lead, which therefore cannot enter into formulæ with it. Charcoal also decomposes it at a high temperature. Its constituents, according to the analysis of Mr. Phillips⁵, are 45.79 of

¹ Vide *London Medical Review*, April 1810, p. 135.

² This, when dried, is of a deep red colour, and is the *colcothar* of commerce.

³ *London Medical Review*, April 1810.

⁴ Hassenfratz, *Ann. de Chimie*, xxviii. 12.

⁵ *System of Chemistry*, 4th ed. ii. 660.

acid, 54.21 of alkali; that of Berzelius 45.0 of acid, and 55.0 of alkali; and that of Berard 42.76 of acid, and 57.24 of alkali.¹

Medical properties and uses.—This salt is deobstruent and cathartic. It is given with great advantage in the visceral obstructions to which children are liable; and in combination with rhubarb or with aloes, I have found it more useful than any of the other saline purgatives in jaundice and dyspeptic affections. On account of its sparing solubility, it is generally given in the form of powder; in doses of from grains x to ʒj, according as it is intended to act as a deobstruent or purgative.

Official preparations. *Pulvis Ipecacuanhæ compositus.* L. E. D. *Pulvis Scammoniac compositus.* L.

POTASSÆ SUPERSULPHAS. Lond. *Supersulphate of Potash.*

“Take of the remains after the distillation of the nitric acid, *two pounds*; boiling water, *four pints*. Mix them, that the salt may be dissolved, and filter. Then boil the solution till one half is dissipated, and set it aside to crystallize. Pour off the water, and dry the crystals on bibulous paper.”

This salt is the *Sal emacum* of commerce. The solution should not be filtered until it be cold, as a copious deposition of uncrystallized salt takes place when it is filtered while hot.

The excess of sulphuric acid is so very loosely combined with sulphate of potash, that great part of it may be washed off by water; but nevertheless, the crystallized salt differs in several respects from the neutral sulphate.

Qualities.—Its crystals are long, hexangular prisms, impressing a sour and slightly bitter taste. It reddens the vegetable blues; is soluble in five parts of water at 60°; in less than an equal weight of boiling water; and effervesces with the carbonates of alkalies. The proportions of its constituents are stated to be, of potash 38, acid 62; but these are not accurately ascertained.

Medical use.—As a remedy its efficacy is as yet unknown; but we are informed² that it has been introduced into the pharmacopœia from an idea that it will afford “a useful means of producing the effects of sulphuric acid combined with those of an opening salt; and it may be exhibited at once in a solid form, an indication which is often desirable.”

SULPHAS POTASSÆ CUM SULPHURE. Edin. *Sulphate of Potash with Sulphur.*

“Take of nitrate of potash in powder, and of sublimed sulphur, *equal weights*. Mix them well together, and throw the

¹ *Annales de Chimie*, lxxi. 47.

² *Powell's Translation of the London Pharmacopœia*, 2d ed. 73.

mixture in small quantities at a time into a red hot crucible. The deflagration being finished, let the salt cool, and preserve it in a well stopped glass vessel."

In this process the sulphur is oxidized, and converted partly into sulphuric acid, and partly into sulphurous acid, by uniting with the oxygen afforded by the decomposition of the nitric acid of the nitrate, which is effected by the degree of heat employed. During the deflagration, however, a part of the acid is volatilized in the form of nitrous oxide, and consequently the oxygen evolved is not sufficient to acidify all the sulphur, and the unaltered portion remains united with a portion of potash. The sulphuric and sulphurous acids combine with the remainder of the potash; and hence the product is a mingled mass, consisting of sulphate or supersulphate of potash; sulphate of potash; and sulphuret of potash.

Qualities. — This salt has a sensibly acid taste, and reddens infusion of litmus. It is almost wholly dissolved in eight parts of water at 60°; and by exposure to the air it is altogether converted into sulphate of potash. In general I have found that it emits no sulphureous odour on the addition of sulphuric acid, and is not precipitated by acids; but in other specimens prepared with equal care sulphur was thrown down by the muriatic acid.

Medical properties and uses. — The same as those of sulphate of potash; and consequently it is scarcely ever used.

AQUA ALCALINA OXYMURIATICA. *Dub. Oxy-muriatic alkaline Water.*

"Take of muriate of soda dried, *two pounds*; manganese in powder, *a pound*; water, sulphuric acid, each *two pounds*. Mix together the muriate of soda and manganese, put them into a matrass, and add the water; then, by means of a proper apparatus, add gradually, and at intervals, the sulphuric acid; and transmit the disengaged gas through a solution consisting of *four ounces* of (*sub*) carbonate of kali, and *twenty-nine ounces* by measure of water. Towards the end of the operation apply a moderate heat to the matrass. The specific gravity of this solution is to that of distilled water as 1087 to 1000."

For this process Woulfe's apparatus is necessary; two-thirds of the alkaline solution being put into the second bottle, and the remainder into the third. The sulphuric acid in the matrass unites with the soda of the muriate, and disengages the muriatic acid; which receiving oxygen from the black oxide of manganese is converted into oxymuriatic acid, and passes over in the gaseous form into the alkaline solution, where it unites with the potash of the subcarbonate, and sets free the

carbonic acid in an elastic state. To prevent the inconvenience likely to result from the extrication of the carbonic acid gas, a solution of lime should be put into the last bottle of the range of receivers. The product in the receivers is a solution of oxymuriate of potash, containing some uncombined oxymuriatic acid; what remains in the matrass is a mixed sulphate of soda and of manganese. When the alkaline solution is stronger, in the proportion of 3xvj of the subcarbonate to Oiv of water, a sparingly soluble crystallized salt is procured, which is regarded as a hyperoxymuriate of potash, and is a more certain preparation than the solution.

Qualities. — This solution has in a slight degree the odour of oxymuriatic acid, and a cooling taste. It destroys the vegetable colours, owing to the excess of acid it contains.

Medical properties and uses. — Oxymuriate of potash is stimulant and diuretic. The supposition which prevailed, that the effects of the nitric acid in syphilis arose from its imparting oxygen to the system, brought forward this preparation as a remedy in the same disease; and its use was soon extended to scurvy and other complaints which were supposed to depend on a deficiency of oxygen. But although it evidently has the power of checking for a time the action of the syphilitic virus, yet it has scarcely in any case succeeded in effecting a cure; and consequently it has fallen into disrepute, and is now seldom employed in any case.

POTASSÆ TARTRAS. Lond. *Tartrate of Potash.*¹

“Take of subcarbonate of potash, *sixteen ounces*; supertartrate of potash, *three pounds*; boiling water, *a gallon*. Dissolve the subcarbonate of potash in the water, and add the supertartrate of potash reduced to powder till the effervescence ceases. Filter the solution through paper; then boil it until a pellicle appears on the surface, and set it aside to crystallize. Having poured off the water from the crystals, dry them on bibulous paper.”

TARTRAS POTASSÆ; Edin. *Tartrate of Potash.*

“Take of subcarbonate of potash, *one part*; supertartrate of potash, *three parts, or a sufficient quantity*; boiling water, *fifteen parts*. To the subcarbonate dissolved in the water add in small portions the supertartrate of potash, reduced to a fine powder, as long as it excites effervescence, which gradually ceases before three times the weight of the subcarbonate of potash be added; filter the solution when it is cold, and after due evaporation set it aside that crystals may form.”

TARTRAS KALI. Dub. *Tartrate of Kali.*

¹ *Kali Tartarizatum*, P. L. 1787. *Tartrate de Potasse* (F.) *Weinsteinsäures Kali* (G.) *Tartrato di Potassa* (I.)

"Take of subcarbonate of kali, *a pound*; crystals of tartar reduced to a very fine powder, *two pounds and a half*; or a quantity sufficient to saturate the kali; boiling water, *a gallon*. To the subcarbonate of kali dissolved in the water gradually add the tartar; filter the solution through paper, evaporate, and set it aside that crystals may form as it cools."

In these processes the superabundant acid of the supertartrate of potash is saturated by the potash of the subcarbonate, and a neutral tartrate obtained. The quantity of alkali required for this purpose must necessarily vary, owing to the degree of dryness of the subcarbonate employed. To obtain regular crystals, a very slow nearly spontaneous evaporation is necessary: and, therefore, this salt as found in the shops, and prepared on a large scale, is in the form of a white granular powder, which is produced by the evaporation being continued to dryness with frequent stirring.

Qualities. — This salt has a bitterish cool taste. Its crystals are tetrahedral prisms, terminated by dihedral summits; and in this state it is soluble in its own weight of water at 60°; but in the granular form, four parts of cold water are required for its solution. When long kept in solution, its acid is decomposed, and its alkali remains in the state of a subcarbonate.¹ Alcohol also dissolves it readily. It is partially decomposed by even the weaker acids and acidulous solutions, as of tamarinds and other acid fruits, which reduce it to the state of supertartrate; and it is completely decomposed by lime-water, muriate of barytes, magnesia, nitrate of silver, and acetate and superacetate of lead. Its constituents, abstracting the water of crystallization, are, in 100 parts, 58.69 of acid, and 41.31 of alkali.²

Medical properties and uses. — Tartrate of potash is a valuable purgative, operating easily and without griping; and even correcting the griping properties of some other substances, as of senna and the resinous purgatives, with which it is, therefore, usually combined. The dose is from ʒj to ʒj in solution.

AQUA SUPERCARBONATIS POTASSÆ. Edin. *Water of Supercarbonate of Potash.*

"Take of water, *ten pounds*; pure subcarbonate of potash, *one ounce*; dissolve, and expose the solution to a current of carbonic acid gas arising from carbonate of lime in powder, *three ounces*; sulphuric acid, *three ounces*; and water, *three pounds*; gradually and cautiously mixed. The chemical apparatus of Dr. Nooth is well adapted for this preparation. But if a larger quantity of the solution be required, an apparatus

¹ Murray's Chemistry, 2d. ed. iv. 329.

² Berzelius.

which will admit of a sufficiently great pressure should be employed. The solution must be preserved in well stopt vessels.

This water is seldom sufficiently impregnated with the acid, when made on a small scale; but in the great way, and with an apparatus from which a much greater pressure is obtained, a solution is prepared for sale which contains a very large quantity of uncombined carbonic acid.

Qualities.—When properly prepared, this solution has a pungent, acidulous taste, and reddens tincture of litmus; is perfectly transparent, sparkles when poured into a glass, and effervesces violently with all the acids.

Medical properties and uses.—This solution is tonic, diuretic, and antacid. It has also been regarded as a lithontriptic, and is much used in calculous cases: but its properties as a solvent of calculi, if it possess any, must depend upon the potash it contains, and, hence, the more completely it is impregnated with carbonic acid, the more its lithontriptic powers must be diminished. There is, however, reason for believing, that even pure potash when taken into the stomach exerts no influence on ready-formed calculi, and consequently its operation, even as a palliative or preventive, is confined to the stomach, where it neutralizes the acid that always prevails there in calculous affections, and relieves many of the uneasy symptoms it occasions. In this view, the solution of the supercarbonate is a grateful mode of exhibiting potash, as its acrimony is destroyed by its combination with the acid, which is nevertheless so weak as not to interfere with its operation as an alkali. On the same principles it proves beneficial in dyspepsia and gout, and forms with lemon juice an effervescing draught still preferable to that prepared with the carbonate. The dose in calculous affections is $f\bar{3}viii$, taken three or four times a day.

SODA TARTARIZATA. Lond.¹ *Tartarized Soda.*

“Take of subcarbonate of soda, *twenty ounces*; supertartrate of potash in powder, *two pounds*; boiling water, *ten pints*. Dissolve the subcarbonate of soda in the water, and add gradually the supertartrate of potash. Filter the solution through paper; then boil till a pellicle forms on the surface, and set it aside to crystallize. Pour off the water from the crystals, and dry them on bibulous paper.”

TARTRAS SODÆ ET POTASSÆ. Edin. *Tartrate of Soda and Potash.*

“Take of subcarbonate of soda, *one part*; supertartrate of potash, *three parts*, or a sufficient quantity; boiling water, *fifteen parts*. To the subcarbonate dissolved in the water, gradually

¹ Tartrate de Soude et de Potasse (F.) Natrum-weinstein (G.) Tartrato di Pottassa e di Soda (I.)

add the supertartrate rubbed to a fine powder, as long as effervescence is excited, which generally occurs before three times the weight of the subcarbonate is added: when the fluid is cold, filter it through paper, and after a proper degree of evaporation, set it aside, that crystals may form."

TARTARUS SODÆ ET KALI. Dub. *Tartrate of Soda and Kali.*

"Take of carbonate of soda, *twenty ounces*; crystals of tartar, reduced to a very fine powder, *two pounds*; boiling water, *ten pints*. Dissolve the carbonate of soda in the water, and gradually add the tartar; filter the solution through paper; evaporate it, and set it aside, that, as it slowly cools, crystals may form."

In these processes the superabundant acid of the supertartrate is saturated by the soda of the subcarbonate, the carbonic acid of which is dissipated in the gaseous form; and a triple salt is obtained by the evaporation, instead of two distinct salts being formed from the different alkaline bases.

Qualities.—This salt has a bitter saline taste. Its crystals are large, regular, transparent, hard, rhomboidal, six-sided prisms; very slightly efflorescent, and soluble in five parts of water at 60°. It is decomposed by the strong acids, muriate of barytes, lime, and by a red heat. The constituents of 100 parts of this salt, according to Schulze, are 41.3 of tartaric acid, 14.3 of potash, 13.3 of soda, and 31.1 of water¹; but, according to Vauquelin, they are, tartrate of potash, 54 parts, tartrate of soda 46 parts.

Medical properties and uses.—Tartrate of potash and soda is a cooling and not very unpalatable cathartic. It was introduced into practice by M. Seignette², an apothecary of Rochelle, and the preparation kept a secret until it was discovered and published by Boulduc and Geoffrey in 1731. It operates moderately, and without exciting much irritation; hence it is well suited to nephritic and puerperal cases. The dose is from ʒj to ʒjss, dissolved in any convenient vehicle.

SODÆ CARBONAS. Lond.³ *Carbonate of Soda.*

"Take of subcarbonate of soda, *a pound*; subcarbonate of ammonia, *three ounces*; distilled water, *a pint*. To the solution of the subcarbonate of soda in the water, add the ammonia; then expose the mixture in a sand-bath to a heat of 180° for three hours, or until the ammonia be expelled; finally, set it apart to crystallize. The residuary liquor may be evaporated in the same manner, and set apart again to crystallize."

In these processes the subcarbonate of soda is nearly neutralized by the action of the same affinities as are exerted in the formation of the carbonate of potash.

¹ Gehlen Journ. iv. 210. Thomson's Chemistry, 4th edit. iii. 96.

² Hence its appellations of *Sal de Seignette*, *Sal Ruppellensis*.

³ Carbonate de Soude (F.) Kohlensaures Natrium (G.) Carbonato di Soda (I.)

CARBONAS SODÆ. Edin. *Carbonate of Soda.*

"Take of subcarbonate of soda, *two parts*; water, *three parts*. Dissolve the salt in the water, and subject it to a stream of carbonic acid gas, until the acid be no longer absorbed. Then filter the fluid and evaporate it in a heat not exceeding 180° , that it may crystallize. The carbonic acid form equal weights of pulverized carbonate of lime and sulphuric acid diluted with much water.

Mr. Phillips has remarked, that the proportion of the ammonia is too small by half an ounce to convert the subcarbonate of soda into bicarbonate of soda.¹ Although the soda is certainly not completely neutralized, as it still changes to green the vegetable blues; a defect which must be ascribed to the nature of the operation. The constituents of the neutral carbonate, according to Rose, are, in 100 parts, 49 of acid, 29.85 of alkali, and 20.20 of water. This salt does not appear to possess any advantages over the subcarbonate as a remedy, and may be therefore regarded as a redundant preparation.

SODÆ SUBCARBONAS. Lond.² *Subcarbonate of Soda.*

"Take of impure soda (*barilla*) in powder, *a pound*, boiling distilled water, *four pints*. Boil the soda in the water for half an hour, and filter the solution. Evaporate it to two pints, and set it apart that crystals may form. Throw away the liquor that remains."

SUB-CARBONAS SODÆ. Edin. *Subcarbonate of Soda.*

"Take of impure carbonate of soda, *any quantity*. Bruise it, and then boil it in water until all the saline matter be dissolved. Filter the solution through paper, and evaporate it in an iron vessel, so that after refrigeration crystals may form."

Dublin.

"Take of barilla in powder, *ten pounds*; water, *two gallons*. Boil the barilla in the water, in a covered vessel, for two hours, occasionally stirring; filter the liquor; then bruise the barilla that remains with an equal quantity of water, and again boil it: this may be repeated a third time. The leys being filtered and mixed, evaporate them to dryness in a wide iron vessel, taking care that the saline mass, which will remain, be not again liquefied by too great a heat: stir it with an iron spatula till it becomes white; finally dissolve it in boiling water, and, after due evaporation, set it apart, that, as it cools, crystals may form. These will be purer if the barilla before each boiling be exposed for some time to the air. The crystallization should be effected when the air is at the freezing temperature, and in a liquor the specific gravity of which is, to that of water, as

¹ Remarks on the Editio Altera, p. 27.

² Natron Preparatum, P.L. 1787.
Souscarbonate de Soude (P.) Sotto carbonato di Soda (I.).

1220 to 1000. If the salt be not very pure, repeat the solution and crystallization."

Barilla, besides the subcarbonate of soda, contains sulphate and muriate of soda, charcoal, lime, magnesia, argil and silex, from which these processes are intended to separate it. The earths being insoluble are separated by the solution and filtration; while the foreign salts remain dissolved in the residuary liquor after the subcarbonate of soda has crystallized. In the London formula, it has been justly observed¹, the evaporation is directed to be too soon stopped. One pound of barilla yields, when properly managed, from 3ij to 3v of the crystallized subcarbonate.

A pure subcarbonate of soda is now manufactured, on a great scale, by the decomposition of sulphate of soda, and of muriate of soda, which will probably supersede altogether the processes ordered in the pharmacopœias.²

Qualities.—Subcarbonate of soda has a mild alkaliescent taste, and changes the vegetable blue and red colours to green. Its crystals are large transparent octohedrons, truncated at the summits of the pyramids, which effloresce when exposed to a dry air, and crumble down into a white opaque powder. It undergoes the watery fusion, at 150° Fah.; is soluble in two parts of water at 60°, and in considerably less than its weight of boiling water, its abundant water of crystallization assisting the solution of the salt at that temperature. Its constituents, according to the late analysis of D'Arcet³, are, in 100 parts, 16.04 of acid, 20.85 of alkali, and 63.61 of water; but, Berard makes them to be 13.98 of acid, 23.33 of alkali, and 62.69 of water. By treating this salt in the method described under subcarbonate of potash, any muriates or sulphates it may contain are detected, while the tartaric acid, added to its solution, discovers potash, by forming a precipitate of the supertartrate.

Medical properties and uses.—This salt is antacid and deobstruent. It is less acrid than the subcarbonate of potash; and hence is in more general use in dyspepsia and acidities of the stomach, and in scrophulous affections. Its use has been lately strenuously recommended in whooping-cough, the protraction of which it is said to prevent. It is given at first, after the stomach and bowels have been duly evacuated, in combination with ipecacuanha and opium, and afterwards, when the violence of the cough has abated, with myrrh or cinchona.⁴ The dose of this salt is from grs. x, to 3j, given twice or thrice a day.

¹ *London Medical Review*, April 1808. 139.

² For experimental purposes, it is obtained, still purer from the crystallized acetate by ignition.

³ *Annales de Chimie*, lxxi. 208.

⁴ *Medico-Chirurgical Transactions*, vol. i.

Official preparation. *Sodæ Subcarbonas exsiccata*. L. D. *Sodæ Carbonas*. L. *Aqua Supercarbonatis Sodæ*. E. *Phosphas Sodæ*. E. D. *Soda tartarizata*. L. E. D.

SODÆ SUBCARBONAS EXSICCATA. Lond.² *Dried Subcarbonate of Soda.*

"Take of subcarbonate of soda, a pound. Expose the subcarbonate of soda to a boiling heat in a clean iron vessel, until it becomes perfectly dry, and at the same time stir it diligently with an iron spatula. Finally, rub it into a powder."

CARBONAS SODÆ SICCATUM. Dub. *Dried Carbonate of Soda.*

"Liquefy the crystals of carbonate of soda in a silver crucible over the fire; then, in an augmented heat, stir the dissolved salt until by the evaporation of the water it becomes dry. Reduce it to a fine powder, and preserve it in stoppered phials."

Owing to the great proportion of water of crystallization this salt contains, it readily undergoes the watery fusion, and is completely dried by continuing the heat; but its properties are not otherwise altered. The constituents of 100 parts, in this state, according to the analysis of Kirwan, are 40.14 of acid, and 59.86 of soda¹, which nearly accords with the analysis of Dulong and Dalton.

Medical properties and uses. — The chief advantage obtained from drying the subcarbonate of soda is the facility of exhibiting it in the form of pills; for when the crystallized salt is used for this purpose, the pill formed with it falls to pieces as soon as the salt effloresces. Dr. Beddoes³ has extolled it, in this form, as a remedy in calculous affections: and it certainly affords relief from the painful symptoms attending calculus in the kidneys, and other urinary affections: but its effects are palliative only; and depend on its destroying the prevalent acid in the stomach. The dose is from grs. x. to grs. xv., given three times a day. Beddoes directed it to be combined with soap and aromatics.

AQUA SUPER-CARBONATIS SODÆ. Edin. *Water of Super-carbonate of Soda.*

"Take of water ten pounds; subcarbonate of soda, two ounces; dissolve and subject the solution to a stream of carbonic acid gas procured from three ounces of carbonate of lime, and the same quantity of sulphuric acid, with three pounds of water, gradually and cautiously mixed together. It may be conveniently prepared in Nooth's apparatus. But if a large quantity of it be required, an apparatus capable of affording

¹ Soucarbonate de Soude sec (F.) Getrocknetes Kohlensaures Natrum (G.) Soto carbonato di Soda secco (I.)

² Nicholson's Journal, 4to. iii. 215. ³ Beddoes on the Nature and Cure of Calculus.

a greater pressure will be requisite. The fluid must be preserved in well-corked bottles.

This preparation is milder and pleasanter than the water prepared with subcarbonate of potash. It is manufactured in large quantities on a great scale, of a much superior quality to any which the apothecary can prepare; and is in very general use as a cooling beverage. Half a pint of it poured over two table-spoonfuls of lemon-juice, sweetened with a little sugar, forms an excellent and very agreeable effervescing draught; and the same quantity poured upon two ounces of boiling milk forms an excellent substitute for asses' milk.

SODÆ SULPHAS. Lond.* *Sulphate of Soda.*

"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; then add gradually as much subcarbonate of soda as will saturate the acid. Boil the solution until a pellicle appears, and after having filtered it set it apart to crystallize. Pour the water from off the crystals, and dry them on bibulous paper."

SULPHAS SODÆ. Edin. *Sulphate of Soda.*

"Dissolve in water the acidulous salt which remains after the distillation of muriatic acid, and having mixed with it carbonate of lime (*chalk*) in powder to remove the superfluous acid, set it apart until the impurities subside; then, having poured off the liquor, filter it through paper, and reduce it by evaporation, that crystals may be formed."

Dublin.

"Dissolve the salt which remains after the distillation of muriatic acid in a sufficient quantity of boiling water. Evaporate the filtered solution to a proper point, and set it apart, that, as it slowly cools, crystals may form.

The theory of the London process for preparing this salt is analogous to that of the process for preparing the sulphate of potash; but, from the low price of the salt, manufactured on a great scale (see *Part ii.*) it is preferable to saturate the superabundant acid with chalk, and reject the sulphate of lime. The salt obtained by the Dublin process has a slight acidulous taste, and contains a quantity of sulphuric acid, but so loosely combined as scarcely to entitle it to be regarded as a supersalt; nor do its crystals differ in form from those produced by the other two formulæ."

Qualities.—The taste of this salt is at first simply saline, but

* Natron Vitriolatum, P. L. 1787. Sulphate de Soude (*F.*) Krystalisirtes Natrum (*G.*) Solfato di Soda (*I.*)

† The crystals of the supersulphate formed by dissolving the sulphate in sulphuric acid, and crystallizing, are rhomboidal.

afterwards very disagreeably bitter. Its crystals are transparent, six-sided, irregular, channelled prisms, with dihedral summits; efflorescent and rapidly fall to a white powder when exposed to the air. It is soluble in 2.86 parts of water at 60°, and 0.8 of boiling water; undergoes the watery fusion when heated, and in a strong heat is partially decomposed. According to Berzelius, 100 parts contain 24.64 of acid, 19.36 of alkali, and 56 of water; and in the dried state, according to Bulcholz, 54 acid, and 46 of alkali.¹

Medical properties and uses.—Sulphate of soda is a very common and useful purgative; but from its nauseous taste it is not very generally prescribed by the physician. The dose is from ʒi to ʒij, but in the effloresced state half of these quantities is sufficient.

PHOSPHAS SODÆ. Edin.² *Phosphate of Soda.*

“Take of bones, burnt to whiteness and reduced to powder, *ten pounds*; sulphuric acid, *six pounds*; subcarbonate of soda, a sufficient quantity of bones with the sulphuric acid in an earthen vessel; then add the water, and again mix: keep the vessel in a vapour-bath for three days; after which, dilute the matter with nine pounds more of boiling water, and strain through a strong linen cloth, pouring boiling water gradually over it until the whole of the phosphoric acid be washed out. Set the strained liquor apart that the impurities may subside, from which pour it off, and evaporate it to nine pounds. To this liquor separated from its impurities, and heated in an earthen vessel, add a warm solution of subcarbonate of soda, until the effervescence cease: then strain, and set the liquor aside that crystals may form. These being removed, add to the liquor, if necessary, a little subcarbonate of soda, that the phosphoric acid may be accurately saturated; and dispose it by evaporation again, to yield crystals, as long as these shall be produced. Finally, let the crystals be preserved in a well-closed vessel.”

Dublin.

“Take of burnt bones reduced to powder, *five pounds*; sulphuric acid *three pounds and an half*. Mix the powder with the sulphuric acid in an earthen vessel; add, gradually, five pints of water, and agitate the mixture. Digest for three days, adding from time to time more water, lest the materials should become dry, and continue the agitation; then pour over them five pints of boiling water, and strain through a linen rag, pouring on, at intervals, boiling water, until all the acid be washed out. Set the liquor apart that the impurities may subside, from which decant it, and evaporate it to one half;

¹ *Nicholson's Journal*, 4to. iii. 215.

² Phosphate de Soude (P.) Phosphorsaures Natrum (G.) Fosfato di Soda (I.)

then add three pounds ten ounces of carbonate of soda (dissolved in a sufficient quantity of warm water); filter, and obtain crystals by repeated evaporation and cooling. The crystals are to be preserved in well closed vessels.

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

When bones are burnt to whiteness, the residue is chiefly phosphate of lime, 100 parts of which consist of 41 parts of acid, and 59 of base¹, with a small portion of carbonate of lime. The addition of sulphuric acid, as directed in the above formulæ, abstracts 0.40 parts of the lime, so as to form an insoluble sulphate of lime, and, involved in its mass, a soluble superphosphate of lime, for the separation of which the digestion in vapour and the repeated effusions of boiling water are ordered. The soda of the subcarbonate of soda, which is added to the defecated and filtered solution, now unites with the superabundant phosphoric acid, by which means the lime is again left combined with as much of this acid only as renders it a neutral phosphate, which from its insolubility precipitates, and is easily separated from the phosphate of soda, which being soluble, remains dissolved in the water, and crystallizes on the subsequent evaporation of the filtered liquor.

There are some niceties in the manipulation of this process that require to be noticed. In the first place, if too much sulphuric acid be employed, sulphate of soda will be also produced; and as four parts only of sulphuric acid are required to decompose ten parts of phosphate of lime, both the above formulæ err in this particular: secondly, as the phosphate of soda does not crystallize well without an excess of base, a little more subcarbonate of soda must be added than is required simply to neutralize the excess of acid of the superphosphate: and lastly, the evaporation must not be carried quite to the formation of a pellicle, as in this case the crystallization is indeterminate, and the whole often concretes into an irregular mass.²

Qualities.—This salt has a purely saline taste, resembling very much that of common salt. Its crystals are large, regular, transparent, rhomboidal prisms, terminated by three-sided prisms, having a specific gravity of 1.333, efflorescing on exposure to the air. It is soluble in three parts of water

¹ Vauquelin.

² A cheaper mode of preparing this salt has been given by M. Funcke, a German chemist. He adds to the matter of calcined bones diffused in water, just enough dilute sulphuric acid to saturate the small portion of carbonate of lime it always contains. When the effervescence ceases, the whole is dissolved in nitric acid, and as much sulphate of soda added to the solution as of bone ashes used. The whole is then distilled to recover the nitric acid; and the phosphate of soda is separated from the residue, which is a mixture of sulphate of lime and phosphate of soda, by solution and crystallization.

at 60°, and in two parts of boiling water; and undergoes the watery fusion when heated. Its constituents, according to Thenard, are, in 100 parts, 19 of soda, 15 of phosphoric acid, and 66 of water; and according to Berzelius 20.33 of acid; 17.67 of base, and 62.80 of water. Muriate of barytes, lime, and magnesia, decompose this salt; and by the strong acids it is converted into superphosphate of soda.

Medical properties and uses. — Phosphate of soda is a mild cathartic, excellently adapted for children, and others who have a fastidious taste. It may be given dissolved in gruel, or broth, made without salt, by which its taste is very effectually covered. The dose is from ʒvj to ʒij. It was introduced into practice by Dr. George Pearson of London.

MURIAS SODÆ SICCATUM. Dub.* *Dried muriate of Soda.*

“Take of muriate of soda, *any quantity*. Roast it over the fire in an iron vessel slightly covered, until it cease to decrepitate, occasionally agitating.”

One hundred parts of crystallized muriate of soda contain, according to Kirwan, 8.12 of water, which is nearly dissipated by the heat; and the salt is thus rendered of a more uniform strength. It is employed chiefly for the distillation of muriatic acid, which is obtained colourless from the dried salt.

EARTHS AND EARTHY SALTS.

EARTHS possess peculiar properties, which distinguish them from other bodies, and constitute them a distinct class of natural productions. They are opaque, solid, unflammable, of very difficult fusibility, very sparingly soluble in water, and of a specific gravity not exceeding 4.9. Some of them resemble the alkalies in several particulars; are caustic, change to green the vegetable blues and reds, and neutralize acids; and have therefore been denominated **ALKALINE EARTHS**. Of this division three are medicinally employed; namely, **LIME**, **MAGNESIA**, and **BARYTES**; but the two former only are used as remedies in their pure state. Those earths which do not possess alkaline properties are denominated **PROPER EARTHS**; of which one only, **ALUMINA**, is a medicinal agent; and it is not used in its uncombined state.

Although some of the old chemists conjectured that the pure earths were metallic oxides, yet no direct proofs in support of the supposition were obtained, and they were generally

* Muriate de Soude sec (F.) Getrocknetes salzsaures Natrum (G.) Muriato di Soda secco (I.)

supposed to be simple bodies, until the discoveries of Sir H. Davy revived the idea of their metallic nature.

The action of the pure earths on the animal economy is very similar to that of the alkalies.

The EARTHY SALTS¹ are compounds of the acids with the pure earths, resembling the salts formed by the combination of acids with alkalies. Some of them are crystallizable, and soluble in water; others are nearly insoluble: some of them exert scarcely any action on the animal economy; while others are possessed of great activity, and produce very striking effects.

In extemporaneous prescription, it is absolutely necessary to avoid combining the earths or earthy salts with substances with which they form insoluble compounds.

The following Table shows the solubility of the above earths, and of the compounds which they form with acids.

PURE EARTHS.	Solubility in one part of Water.	ACIDS which, in combination with these Earths, form		
		Soluble Compounds.	Compounds scarcely soluble.	Insoluble Compounds.
Lime.....	0.002	Nitric Muriatic Acetic Benzoic Malic	Sulphuric Boracic Succinic Tartaric	Oxalic Phosphoric Carbonic Arsenic
Magnesia	0.000	Sulphuric Phosphoric Nitric Muriatic Carbonic Acetic Benzoic Succinic Malic	Tartaric	Boracic Oxalic
Barytes...	0.050	Nitric Muriatic Acetic Benzoic Tartaric	Succinic Carbonic Citric	Sulphuric Oxalic Phosphoric Boracic Arsenic
Alumina.	0.000	Sulphuric Nitric Muriatic Carbonic Acetic Benzoic Oxalic Tartaric	Boracic	Phosphoric Arsenic

¹ We prefer the title *Earths and Earthy Salts* to that of *Earths and their Salts*, which

ALUMEN EXSICCATUM. Lond.¹ *Dried Alum.*

"Melt alum in an earthen vessel over the fire, and increase the heat until the ebullition cease."

Edinburgh.

"Melt the alum in an earthen or iron vessel, and let it be kept over the fire until it cease to boil: then rub it into a powder."

ALUMEN USTUM. Dub. *Burnt Alum.*

"Take of alum *any quantity*. Expose to the heat of a strong fire in an earthen vessel until it cease to boil."

In these processes the alum loses its water of crystallization; but if the heat be too great, its acid is partly expelled, and partially decomposed. According to Kirwan, alum desiccated at 700° loses more than half its acid. By our experiments, English alum lost 0.43 in a moderate heat, and 0.46 in a red; Levant alum, 0.41 in a moderate heat, and 0.44 in a red heat. Chaptal found that in a red heat alum of his own manufacture lost 0.67; Roman alum, 0.50; English, 0.47; and Levant alum, 0.40.

Qualities.—Dried alum has a more astringent taste than the crystallized salt. It is obtained in the form of a light, opaque, white, spongy, friable mass, 100 parts of which consist of 36.25 acid, and 63.75 alumina.

Medical properties and uses.—It is chiefly used as an escharotic to destroy fungus in ulcers; but has also been given internally to the extent of ℥j for a dose in cases of cholera, the pain of which it is said to allay, while at the same time it gently opens the bowels.

CALCIS MURIAS. Lond.² *Muriate of Lime.*

"Take of the salt which remains after the distillation of subcarbonate of ammonia, *two pounds*; water, *a pint*. Mix, and filter the solution through paper. Evaporate the liquor until the salt remains dry. Preserve it in a closely-stopped vessel."

Qualities.—Muriate of lime is inodorous, and has a disagreeable, bitter, acrid taste. It is soluble in half its weight of cold water, and to any extent in boiling water. It rapidly deliquesces in the air, and undergoes the watery fusion when heated. According to Dr. Marcet it is composed of 49 parts of acid and 57 of lime.

CALX. Lond. *Lime.*³

is the title of this section in the London Pharmacopoeia, for the same reason that we preferred the term *Neutral Salts* to that of *Alkaline Salts*.

¹ Sulfate d'Alumine Séc. (F.) Gebrannter Alaun (G.) Allume calcinato (I.)

² Muriate de Chaux (F.) Salzsaure Kalkerde (G.) Muriato di Calce (I.)

³ Chaux (F.) Kalkerde (G.) Calce (I.) Cal viva (S.)

"Take of limestone, *a pound*. Break it into small pieces, and expose it in a crucible to a very strong fire for an hour, or until the carbonic acid be so completely expelled, that on the addition of acetic acid no air bubbles are extricated.

"Lime may be made in the same manner from shells, after they have been washed in boiling water, and freed from all impurities."

Lime prepared on the great scale for the ordinary purposes of art is sufficiently pure for medicinal use; but for some pharmaceutical purposes it is required to be more completely burnt than is usually the case of that which is obtained from the kilns; and perhaps it is with this view that the above preparation has been ordered by the London College. It may, however, be observed, that neither of the substances ordered affords lime in a state of absolute purity; limestone frequently containing silex, alumina, magnesia, and marine shells; and a portion of phosphate of lime which is not decomposed by the fire. To obtain perfectly pure lime, dissolve white marble or clean oyster shells in diluted muriatic acid, and to the filtered solution add solution of ammonia as long as any precipitate falls; then filter again, and decompose the muriate by a solution of pure carbonate of potash; wash the precipitate, and expose it to violent heat in a platinum crucible, till it cease to lose weight. The result is pure lime.

Qualities. — Well prepared lime is of a white colour, moderately hard, and brittle. Its specific gravity is 2.3. Its taste is hot, pungent, and bitter; on animal matter it operates as a most powerful caustic; changes the vegetable blues to green, and is infusible. Water poured on it is absorbed with a hissing noise, much heat is evolved, and the lime swells, falls to pieces, and is then said to be slacked; in which state it readily combines with sulphur, forming a sulphuret, and is to a certain degree soluble in water. It appears to be a compound of a peculiar metal which has been named *calcium*¹, and *oxygen*.

Use. Lime in this state is chiefly employed for pharmaceutical purposes and for forming the solution.

Official preparations. *Liquor Calcis. L. E. D. Potassa cum Calce. L.*

CRETA PREPARATA. Lond.² *Prepared Chalk.*

"Take of chalk, *a pound*. Add a little water to the chalk, and triturate it to a fine powder. Throw this into a large ves-

¹ This metal has the colour and appearance of silver, is solid, four times heavier than water, absorbs oxygen, and burns brilliantly in the open air, and by being oxidized is converted into quicklime. *Phil. Trans.* 1808.

² Craie préparé (F.) Rein Kreide (G.) Carbonato di Calce preparato (I.)

sel of water, stir it, and after a short interval pour off the supernatant turbid water into another vessel, and set it apart that the powder may subside: lastly, let the water be poured off, and dry the powder."

CARBONAS CALCIS PRÆPARATUS. Edin. *Prepared Carbonate of Lime.*

"Let carbonate of lime, triturated to powder in an iron mortar, and levigated with a little water, on a porphyry stone, be put into a large vessel: then pour water upon it, which, after frequently shaking the vessel, is to be poured off loaded with the fine powder. The subtile powder which subsides, when the water remains at rest, is to be dried. Let the coarse powder which the water could not suspend be again levigated, and treated in the same manner."

CRETA PRÆPARATA. Dub. *Prepared Chalk.*

"Let it be triturated to powder in an earthen mortar, with the addition of a little water; then mix this with a sufficiently large quantity of water by agitation, and after a short interval, when the coarser particles have subsided, pour off the fluid. This may be frequently repeated, always previously triturating; and finally, collect the very fine powder, which after some time will subside, and dry it upon an absorbent stone, or paper."

By the suspension of the finer particles of the levigated chalk in water, they are reduced to a more impalpable form, and are more effectually separated from the coarser particles than could be accomplished by any other mechanical means; but the chalk is not freed from the foreign earths it generally contains, (see *Calx*, Part ii.) although it be sufficiently pure for medicinal use.

Medical properties and uses.—Chalk is antacid and absorbent. It is exhibited advantageously in acidities of the primæ viæ; and in diarrhoeas, after all irritating matters have been removed from the bowels by previous evacuation. As an external application it is sprinkled over ulcers discharging a thin ichorous matter, which is thus absorbed by the chalk, and prevented from excoriating the neighbouring sound skin. In cases of burns it is applied in a similar manner, and a poultice laid over it, by which the skimming of the sore is much hastened.¹

The dose of chalk is from grs. x. to ʒij, or more.

Official preparations. *Mistura Cretæ*. L. E. *Hydrargyrus cum Creta*. L. *Pulvis Cretæ compositus*. L. E. *Pulvis opiatus*. E. *Trochisci Carbonatis Calcis*. E.

CRETA PRÆCIPITATA. Dub. *Precipitated Chalk.*

"Take of solution of muriate of lime, any quantity. Add to it as much (*sub*) carbonate of soda, dissolved in four times

¹ *Kentish on Burns*, passim.

its weight of hot distilled water, as may be sufficient to precipitate the chalk. Wash the precipitate three times in a sufficient quantity of water; then collect it, and dry it on a chalk stone or on bibulous paper."

A double exchange takes place in this process; the muriatic acid separates from the lime and unites with the soda, while the carbonic acid of the subcarbonate combines with the lime: the muriate of soda thus formed remains dissolved in the water, but the carbonate of lime is precipitated in the form of a white powder. It is an expensive preparation, and the benefit to be derived from a great degree of purity in this substance is not very obvious.

Official preparations. *Hydrargyrum cum Creta*. D. *Electuarium aromaticum*. D. *Mistura Cretæ*. D.

MURIAS BARYTÆ. Edin.¹ *Muriate of Barytes*.

"Take of carbonate of barytes, muriatic acid, each, *one part*; water, *three parts*. To the water and the acid mixed together add the carbonate broken into small pieces. The effervescence being finished, digest for an hour; then filter, and after due evaporation set the solution apart that crystals may form. Repeat the evaporation as long as any crystals are formed.

"If the carbonate of barytes cannot be procured, the muriate may be prepared from sulphate of barytes in the following manner:

"Take of sulphate of barytes, *two pounds*; charcoal in powder, *four ounces*; muriatic acid, a *sufficient quantity*. Roast the sulphate, that it may be the more easily reduced to a very fine powder, and mix it with the powder of charcoal. Put the mixture into a crucible, and having fitted to it a cover, let it be exposed to a strong fire for six hours; then, having well triturated the matter, put it into six pounds of boiling water, in a glass or earthen vessel, and mix by agitation, preventing, as much as possible, the action of the air.

"Let the vessel stand in a vapour-bath until the undissolved part shall have subsided, and then pour off the liquor. Pour upon the residue four pounds of boiling water, which, after agitation and subsidence, add to the former liquor: and then, while it is still hot, or, if it shall have cooled, after it is again heated, let muriatic acid be dropped into it as long as any effervescence is excited. Then let the solution be filtered and evaporated, that crystals may be formed."

The simplicity of the first of these processes, in which the superior affinity of the muriatic acid for barytes effects the decomposition of the carbonate, recommends its general adoption;

¹ Muriate de Baryte (F.) Salzsäure Schwererde (G.) Muriato di Barita (I.)

and we believe this mineral can now be procured without difficulty, and in abundance. The second, however, may sometimes be required to be performed: it is somewhat complicated, but its theory is sufficiently obvious.

The charcoal, by the assistance of heat, decomposes the sulphuric acid of the sulphate of barytes, attracting its oxygen, and forming with it carbonic acid, which is dissipated in a gaseous form, while the sulphur remains united with the barytes. The boiling water added to this sulphuret dissolves it; but during the solution the water is partially decomposed, a portion of the sulphur attracts the oxygen of the decomposed water, and forming sulphuric acid, unites with a little of the barytes, so as to reproduce some sulphate which precipitates; while its hydrogen unites with another portion of the sulphur, and forms sulphuretted hydrogen, the combination of which, with the remaining sulphuret, converts it into a hydroguretted sulphuret, and prevents its further decomposition. Lastly, the muriatic acid added to the hot aqueous solution of these sulphurets decomposes them, disengages the sulphuretted hydrogen in the form of gas, and precipitates the sulphur; while at the same time it unites with the earth, and muriate of barytes remains in solution.

Several other methods have been proposed for the preparation of this salt, the following is that recommended by Bouillon La Grange.¹ Pulverise together equal parts of sulphate of barytes and muriate of lime; project the mixture into a red hot crucible, and let the fire be continued till the whole be melted, which is then to be poured out on a heated tile. After it is cold, reduce the mass to powder; boil it for some minutes in six times its weight of distilled water, and filter the solution: then evaporate the liquor to a pellicle, and set it aside to crystallize. The crystals require to be redissolved and again crystallized, to free them from any of the calcareous muriate they may retain on the first crystallization. The Edinburgh process, however, is still preferable to this of La Grange, as the previous calcination reduces any metallic salts that may be combined with the sulphate; and being thus rendered insoluble, they are separated during the first solution of the sulphuret.²

Qualities.—Muriate of barytes has an acrid, very nauseous, bitter taste. It crystallizes in grouped quadrangular tables,

¹ *Annales de Chimie*, xlvii. 181.

² Goetling advises muriate of soda to be added to the charcoal, by which a smaller quantity of charcoal is capable of reducing a larger quantity of sulphate of barytes. A mixture of one part of muriate of soda and two parts of muriate of lime is sufficient to decompose six of the sulphate.

bevelled on the edges; transparent, white, and very brilliant; of a specific gravity of 2.8257: and not alterable from exposure to the air. When heated, it decrepitates, becomes opaque, and ultimately melts, but is not decomposed. One part requires three of water at 60° for its solution, and 2.20 of hot water. According to Berzelius, the constituents of 100 parts of this crystallized salt are 61.85 of barytes, 23.35 of muriatic acid, and 14.80 of water.¹ It is used only for forming the following solution:

SOLUTIO MURIATIS BARYTÆ. Edin.² Solution of Muriate of Barytes.

“Take of muriate of barytes, *one part*; distilled water, *three parts*. Dissolve.”

Qualities.—This solution possesses all the chemical and medicinal properties of the muriate. It is limpid, transparent, and colourless; but is rapidly decomposed by the earthy, metallic, and alkaline sulphates and nitrates; the alkaline phosphates, borates, and carbonates, being precipitated in the form of a white powder. Its affinity for sulphuric acid is so great, that, as a re-agent, it is capable of detecting 0.00009 of that acid in any fluid.

Medical properties and uses.—This solution is stimulant and deobstruent, and in large doses poisonous. It was introduced into practice by the late Dr. Crawford as a remedy for cancerous and scrophulous affections; and its use was afterwards extended to syphilis. When taken in moderate doses, it appears to increase the secretion by the skin, augments the flow of urine, and improves the tone of the system; but by large doses, violent vomiting, purging, vertigo, and the most dangerous symptoms, are produced. When death is the consequence, it is owing, as Mr. Brodie has ascertained, to the poison acting on the brain and heart. It has undoubtedly been found beneficial in several instances of scrophula, in some cutaneous affections, and in ulcerations connected with elephantiasis; while in syphilis it has the power of suspending some of the symptoms for a short period. But although it be a medicine of some efficacy, yet, to use the words of Mr. Pearson, in whose opinion of its deficient powers as an antisiphilitic we place implicit faith, its “good qualities are uncertain in their operation, and narrowly circumscribed; nor is it a preparation on which great confidence can be placed for the cure of any ³disease.” The dose requires to be carefully apportioned, and very gradually increased, until from *m v*, which are sufficient at first,

¹ *Nicholson's Journal*, 4to. iii. 25.

² *Dissolution de Muriate de Baryte (P.) Soluzione di Muriato di Barite (I.)*

³ *Observations on Remedies for Lues Venerea*, 92.

℥ xx may be taken twice a day ; or more, if nausea be not excited. It is sometimes used externally as an escharotic to fungous ulcers and specks on the cornea.

As antidotes of muriate of barytes, when it has been taken as a poison, M. Orfila has proposed the soluble sulphates, "if administered before a quantity of the salt sufficient to exert its fatal influence on the nervous system be absorbed."

LIQUOR CALCIS. Lond.² *Lime-water.*

"Take of lime, *half a pound* ; boiling distilled water, *twelve pints*. Pour the water upon the lime, and agitate them together ; cover the vessel directly, and set it apart for three hours ; then preserve the solution upon the undissolved lime, in well stopped glass bottles, and pour off the clear fluid when it is wanted for use."

SOLUTIO CALCIS, sive AQUA CALCIS. Edin. *Solution of Lime, or Lime Water.*

"Take of lime fresh burnt, *half a pound*. Put it into an earthen vessel, and sprinkle upon it four ounces of water, keeping the vessel covered until the lime becomes hot, and falls into powder ; then pour on it twelve pounds of water, and mix the lime with water by agitation. After the lime shall have subsided, repeat the agitation ; and let this be done about ten times, the vessel being kept shut that the free access of the air may be prevented. Finally, let the water be strained through paper, interposing between it and the funnel glass rods, that the water may pass through as quickly as possible. It is to be preserved in very well stopt bottles."

Dublin.

"Take of fresh burnt lime, *a pound* ; boiling water, *a pint*. Put the lime into an earthen vessel, and sprinkle the water upon it, keeping the vessel shut until it becomes hot, and falls into powder ; then pour upon it *three gallons of water*. The vessel being again shut, let the mixture be frequently shaken for twenty-four hours ; and then filter the solution through paper placed in a covered funnel, and preserve it in well stopt bottles."

Of these formulæ, that of the London College is to be preferred ; as by keeping the solution upon the lime it is always in a completely saturated state, and the supernatant fluid is generally sufficiently clear to allow it to be decanted off without filtration. It is however adviseable, in making the solution, first to slack the lime with a small portion of water, before the whole quantity be added ; as by this it is prevented from running into a paste, which confines the action of the water. Water, when

¹ *Traité des Poisons*, &c. vol. i. p. 182.
(G.) *Aqua di Calce (I.)*

² *Eau de Chaux, (F.) Kalkwasser,*

cold, acts more powerfully on lime than hot water, and at 60° retains in solution rather less than 0.002 parts, or one six hundredth part of lime.

Qualities. — Lime water is inodorous; has a strong, styptic, acrid taste; is limpid and colourless; and changes to green the vegetable blue and red colours. It unites with oil, forming an imperfect soap. When exposed to the air, it attracts carbonic acid, which, combining with part of the lime held in solution, forms on its surface a pellicle of carbonate of lime, which thickens, cracks, and sinks to the bottom of the vessel, leaving its place to be supplied by another pellicle; and thus, by successive formations, the whole of the lime is abstracted from the water. Hence the necessity of preserving the solution in well closed bottles. It is decomposed by the acids and sulphur, the alkaline carbonates, phosphates, borates, tartrates, and citrates; the infusions of orange-peel, columba, cinchona, rhubarb, and senna, which are consequently incompatible in formulæ with it.

Medical properties and uses. — Lime-water is tonic, antacid, anthelmintic, and externally detergent. It proves very useful in dyspepsia attended with much acidity of the stomach, by neutralizing the acid, and dissolving the sordid mucus with which it is often loaded in this disease; and has also been found efficacious in diarrhœa, diabetes, and leucorrhœa. It destroys intestinal worms, and dissolves the mucus which forms their nidus; and for the same reason proves serviceable in slimy bowels. Its internal use, however, should be occasionally suspended for a few days, as its long continued action on the stomach is apt to prove hurtful. Externally it is applied as a lotion to foul and cancerous ulcers, tinea capitis, and scabies, but with little advantage.

The dose is from fʒij to ʒss, alone, or diluted with milk.

Official preparations. *Oleum Lini cum Calce.* E. D. *Aqua Calcis composita.* D.

LIQUOR ALUMINIS COMPOSITUS. Lond. *Compound Solution of Alum.*

“Take of alum, sulphate of zinc, each *half an ounce*; boiling water, *two pints*. Dissolve the alum and the sulphate of zinc together in the water; then filter the solution.”

Medical properties and uses. — This solution is astringent and detergent. It is employed as a lotion for cleansing ulcers, and in some cases of cutaneous eruptions. When properly diluted, it forms a useful collyrium in ophthalmia, and an injection in gleet, and in fluor albus when the discharge proceeds only from the vagina.

LIQUOR MURIATIS CALCIS. Lond.¹ *Solution of Muriate of Lime.*

"Take of muriate of lime, *two ounces*; distilled water *three fluid ounces*. Dissolve the muriate of lime in the water, and strain the solution through paper."

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

"Take of the harder variety of carbonate of lime (namely white marble) broken into small 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. The effervescence being finished, digest for an hour. Pour off the fluid, and reduce it by evaporation to dryness. Dissolve the residue in its weight and a half of water, and filter the solution."

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

"Take of chalk reduced to a coarse powder, *one ounce*; diluted muriatic acid, *two ounces*. Add gradually the acid to the chalk, and when the effervescence is finished, filter the solution."

In these processes the muriatic acid unites with the lime of the carbonate, and disengages the carbonic acid, which is dissipated in the gaseous form, while the muriate of lime remains dissolved in the water. The evaporation is unnecessary, if an acid of a determinate specific gravity be employed, as ordered by the Dublin College.

Qualities. — This solution is colourless, and has a disagreeable, bitter, acrid taste. It is decomposed by the sulphuric, nitric, phosphoric, fluoric, and boracic acids; the neutral salts into which these enter; and the alkalies and alkaline carbonates, which precipitate the lime. In the solid state, 100 parts of dry muriate of lime, after being exposed to a red heat, consist of 49 of acid, 51 of lime.² By mixing four parts of it with an equal quantity of snow, a degree of cold is produced capable of sinking the mercury in the thermometer from 32° to 40° below 0° of Fahrenheit.

Medical properties and uses. — Muriate of lime is deobstruent and tonic. It was introduced into practice by Fourcroy, and has been much recommended as a remedy in scrophulous and glandular diseases. I have given it with evident advantage in bronchocele; and have witnessed more benefit result from its continued use in the varied forms of scrophula, than from any other remedy. Its operation is similar to that of muriate

¹ Dissolution de Muriate de Chaux (F.) Liquore di Muriato di Calce (I.)

² Marcet.

of barytes; but the danger of an over dose is less to be dreaded, and its good effects are more uniform and certain. The dose of the solution is from $\mathfrak{mxx}$ to $\mathfrak{fj}$, increased gradually to $\mathfrak{fjiv}$, in a sufficient quantity of water or milk, repeated twice or thrice a day.

MAGNESIA. Lond.¹ *Magnesia.*

"Take of (*sub*) carbonate of magnesia, *four ounces*. Burn it in a very strong fire for two hours, or until no effervescence is excited when acetic acid is dropped on it."

Edinburgh.

"Let (*sub*) carbonate of magnesia be exposed in a crucible to a red heat for two hours; after which preserve it in close stopped bottles."

MAGNESIA USTA. Dub. *Calcined Magnesia.*

"Take of magnesia *any quantity*. Let it be put into a crucible, and subjected to a strong heat for two hours; and when it has cooled preserve it in a well closed glass vessel."

The carbonic acid is expelled by the heat, and the pure earth remains in the proportion of five-twelfths of the weight of the subcarbonate employed; or $\mathfrak{fj}$ leaves 200 grs. of magnesia.²

Qualities.—It is inodorous and insipid; in the form of a white, very light, soft powder, having a specific gravity of 2.3. It turns to green the more delicate vegetable blues; does not effervesce with acids; is infusible; and requires for its solution 2000 parts of water at 60°. When exposed to the air it attracts slowly carbonic acid. Sir H. Davy has ascertained that, like the other alkaline earths, it is a compound of a peculiar metal, which he has named *magnesium*, and oxygen.

Medical properties and uses.—The same as those of the subcarbonate. It sometimes contains lime, which is discovered by a precipitate falling when oxalate of ammonia is added to its solution in sulphuric acid. Its dose is from grs. x. to $\mathfrak{fss}$. taken in water or milk.

MAGNE'SIÆ CARBO'NAS.³ Lond. *Carbonate of Magnesia.*

"Take of sulphate of magnesia, *a pound*; subcarbonate of potash, *nine ounces*; water *three gallons*. Dissolve separately the subcarbonate of potash in three pints of water, and the sulphate of magnesia in five pints, and filter: then add the rest

¹ *Magnesie (F.) Gebrannto Magnesia (G.) Magnesia (I.)*

² *Black on Magnesia Alba, 28.*

³ *Carbonate de Magnésie (F.) Kohlensaure Magnesia (G.) Carbonato di Magnesia (I.)* This preparation should be denominated *Subcarbonas Magnesiæ*. Carbonate of magnesia is obtained by using a larger proportion of the subcarbonate, and allowing the filtered solution to remain at rest for three days. It crystallizes in small transparent hexagonal prisms, terminated by a hexagonal plane. See *Butin sur la Magnésie*.

of the water to the solution of sulphate of magnesia, and boil it, adding to it while it is boiling the solution of the subcarbonate, with constant stirring; and strain through linen. Lastly, wash the powder repeatedly with boiling water, and dry it upon bibulous paper with a heat of 200° ."

CARBONAS MAGNESIÆ. Edin. *Carbonate of Magnesia.*

"Take of sulphate of magnesia, *four parts*; subcarbonate of potash *three parts*; boiling water a *sufficient quantity*. Dissolve the salts separately in twice their weight of water, and strain, or otherwise free from impurities; then mix them, and instantly add eight times their weight of boiling water. Boil the liquor for a short time stirring it; then let it remain at rest until the heat be a little diminished, and strain it through linen, upon which the carbonate of magnesia will remain. The carbonate after being well washed with pure water, is to be dried with a gentle heat."

MAGNESIA. Dub. *Magnesia.*

"Take of sulphate of magnesia, subcarbonate of potash, each *two pounds*; boiling water, *twenty pints*. Dissolve the sulphate of magnesia and the kali, each in ten pounds of water. Mix together the defecated liquors; then boil the mixture for a short time, and strain it while it is hot through linen stretched in a proper manner for collecting the magnesia. Wash away the sulphate of kali by repeated affusions of boiling water; and finally, dry the magnesia."

The product of these processes is an insoluble subcarbonate of magnesia. Both the salts are decomposed, and a double exchange takes place; the sulphuric acid separates from the magnesia, and unites with the potash of the subcarbonate, disengaging the carbonic acid, which in its turn combines with the magnesia. The success of the operation depends very much on the degree of attention which is paid to the following circumstances: The water employed in every part of the process must be very soft, either rain water or pure distilled water; the subcarbonate of potash should be previously freed as completely as possible from any admixture of silica, by passing through the alkaline solution a current of carbonic acid, or exposing it to the air for some time before it be used, and the mixing the salts in small portions of water; and after boiling the mixture, throwing it into a large quantity of water. The large proportion of water ordered, and the boiling, are necessary for dissolving the sulphate of potash, and for expelling any redundant carbonic acid which might occasion the magnesia to crystallize, and render it gritty. Mr. Henry recommends to pour off the water by inclination, and to put the precipitate upon chalk-stones for a little time; after which it is to

be wrapped up in sheets of white paper, and dried before the fire.¹

The greater part, however, of the subcarbonate of magnesia found in the shops is prepared, on a great scale, from bittern, the liquor remaining after the crystallization of common salt from sea water. The bittern is heated to 212° , a solution of impure subcarbonate of potash instantly added to it, and the fire withdrawn. The other steps of the process resemble those above detailed.

Qualities. — Subcarbonate of magnesia is inodorous and insipid; perfectly white, very light, smooth to the touch, nearly insoluble in water, and effervesces with acids. Its specific gravity is 0.294.² It is decomposed by all the acids, the alkalies, the neutral salts, lime, barytes, alumina, and by a strong heat. According to Dalton, the constituents of 100 parts are 40 of acid, 43 of magnesia, and 17 of water.

Medical properties and uses. — Subcarbonate of magnesia is antacid. It is a useful remedy in acidity of the primæ viæ, particularly of children, in aphthous fever, and that which attends dentition. The compound formed by its union with an acid in the stomach is purgative; but if no acid be present, magnesia does not appear to increase in any degree the peristaltic motion of the bowels. It is preferable to chalk and other absorbents in heartburn, when the bowels are costive; and has been given with advantage in dysentery, combined with ipecacuanha and opium, and the dose followed by a draught of lemonade. In calculus, when the concretions are formed in the kidney, no remedy is so efficacious. The extrication of the carbonic acid in the gaseous state, when the subcarbonate is decomposed by acid in the stomach, sometimes proves inconvenient from the distension it occasions; but more generally it is beneficial. The usual dose is from ʒss to ʒij, taken in water or milk.

Official preparations. *Magnesia. L. E. D. Hydrargyrus cum Magnesia. D.*

¹ Henry's Experiments on the Preparation, &c. of Magnesia, 8vo. Lond. 1773.

² Hoffmanni Op. iv. 473.

TABLE presenting a synoptical view of the Neutral Salts with alkaline and earthy bases, employed as remedies, or for pharmaceutical purposes.*

Salts.	Taste.	Figure of Crystals.	Action of Air.	Solubility in 100 parts of Water.		Action of Heat.
				at 60°	at 212°	
Sulphate of barytes	None	Rhomboidal prisms	None	0	0.002	Decrepitates.
— potash	Bitter	Six-sided prisms	None	6.25	24	Decrepitates.
— soda	Bitter	Six-sided prisms	Effloresces	35	125	Watery fusion.
— magnesia	Bitter	Four-sided prisms	None	100	133	Watery fusion.
Alum	Astringent	Octohedrons	Little	20	133	Watery fusion.
Nitrate of potash	Cooling	Six-sided prisms	None	14.3	100	Fuses.
Muriate of barytes	Astringent	Six-sided prisms	None	20	30	Decrepitates.
— soda	Salt	Cubes	None	35.46	36.16	Decrepitates.
— lime	Bitter	Six-sided prisms	Deliquesces	400		Watery fusion.
— ammonia	Acrid	Four-sided pyramids	Subdeliquesces	31	50	Sublimes.
— magnesia	Bitter	Needles	Deliquesces	151		Watery fusion.
Hyperoxymuriate of potash	Cooling	Rhomboidal plates	None	6	40	Gives out oxygen
Phosphate of lime	None	Six-sided prisms	None	0	0	Fuses
— soda	Salt	Rhomboidal prisms	Effloresces	25	50	Watery fusion.
Borax	Styptic	Six-sided prisms	Effloresces		16.8	Watery fusion.
Carbonate of barytes	None	Various	None	0.023	0.043	Little.
— lime	None	Rhomboidal prisms	None	0	0	Decrepitates.
— potash	Alkaline	Four-sided prisms	None	25	83½	Watery fusion.
— soda	Alkaline	Octohedral truncated	Effloresces	50	100+	Watery fusion.
— magnesia	None	Six-sided prisms	Effloresces	2		Decrepitates.
— ammonia	Urinous	Irregular	None	50+	100	Evaporates.
Acetate of potash	Hot	Plates	Deliquesces	99		Melts.
— ammonia	Cool	Slender prisms	Deliquesces	Very soluble.		Melts & sublimes.
Tartar	Acid	Irregular prisms	None	1½	3½	Melts.
Tartrate of potash	Bitter	Four-sided prisms	None	25	50	Melts.
Tartrate of potash and soda	Bitter	Eight-sided prisms	Effloresces	20	30	Melts.

* We have formed this Table from the more general table of Dr. Thomson, correcting some of the proportions by experiment. See *System of Chemistry*, 4th ed. iii. 268.

METALLIC PREPARATIONS.

THE pure metals exert no action on the animal system; for, although iron be given in its metallic state, yet it must be changed by acid in the stomach before it can prove active as a remedy. Tin operates only by mechanical attrition; and mercury, which has also been given internally in the metallic form, on mistaken principles, cannot act otherwise than as a mechanical body: but when metals suffer oxidizement, or are changed by acids to the state of salts, they constitute a class of remedies of great activity and importance. The following are

a. employed as remedies in a metallic state,

TIN, MERCURY?

b. variously combined with oxygen, acids, sulphur, &c.

SILVER,	IRON.	BISMUTH,
MERCURY,	LEAD,	ANTIMONY,
COPPER,	ZINC,	ARSENIC.

The union of oxygen with a metallic base is denominated oxidizement, and the resulting compound an *oxide*. This combination, for medicinal purposes is effected in four ways: 1. By the action of atmospheric air, aided by an increased temperature; 2. By deflagration with nitrate of potash; 3. By the action of water; and, 4. By solution in an acid, the acid being afterwards abstracted by an alkali, or some substance for which it has a greater affinity than it has for the oxide of the metal. In whatever manner the oxidizement is effected, metals in changing to oxides lose their lustre, tenacity, inflammability, and other metallic properties; and are gradually converted into earthy-like substances, the weight of which is greater than that of the portion of metal employed. Different metals combine with different quantities of oxygen, which is even the case with the same metal; and as a striking alteration of properties, particularly of colour, marks the maximum and minimum of oxidizement, this is taken advantage of in naming the oxides: thus *black oxide of iron* is iron in its lowest degree of oxidizement; *red oxide of iron*, the metal in its highest degree of oxidizement. There are intermediate degrees, however, which cannot be correctly expressed in language from the colour alone; and consequently the nomen-

clature of this division of preparations is defective.* Some metals are capable of so high a degree of oxidizement as to acquire acid properties, which is so particularly the case with the white oxide of arsenic, that it is regarded as an acid by several chemists. The activity of the oxides of metals on the animal system appears to be regulated, with a few exceptions, by the quantity of oxygen with which they are combined; and therefore, as Dr. Murray has justly observed, "when a process for the preparation of any metallic oxide has once been established, and practitioners have become accustomed to its powers and strength, the process ought not to be varied or changed, from the idea of some trivial improvement; as an alteration of circumstances, apparently of little importance, may give rise to a very important change in the result. And it is nearly demonstrable, that the oxides of a metal formed by different processes, as, for example, by a process conducted in the humid way, or by one with the application of heat, cannot be precisely the same."²

Besides the above effects of oxidizement on metals, it renders them capable of uniting with acids, and forming soluble salts. The METALLIC SALTS, therefore, are oxides combined with acids; and this is the case, whether an oxide previously prepared be dissolved in an acid, or whether the salt be the product of the direct solution of a metal in an acid. In the latter case, the metal first gains oxygen either from a part of the acid itself, or from the water, or the air, which it decomposes; and the oxide thus formed is then dissolved by the remainder of the acid. The properties of the metallic salts are much varied by the previous degree of oxidizement of the metals; and this is a point, the fixing of which in pharmaceutical operations is of the first practical importance; for, if in all the indefinite degrees of oxidizement the metallic oxides combine with acids, the resulting salts must vary in as many shades as exist between the maximum and minimum of oxidizement. In the preparation of the metallic salts, therefore, the same strict attention is requisite in following one established and approved process.

No part of chemical and pharmaceutical language is so faulty as the nomenclature of the metallic salts. Thus, although there is no instance of a direct combination of a metal

* Dr. Thomson has endeavoured to remedy this defect by introducing the term *protioxide* to signify the lowest degree of oxidizement; *peroxide* the highest; and *deutoxide*, *tritoxide* &c. the intermediate degrees.

² *System of Mat. Med.* ii. 253.

with an acid, yet we have *sulphate of iron*, *nitrate of silver*, *muriate of mercury*, &c.; and to express the combination of the metallic oxides containing a maximum of oxygen, with acids, the syllables *oxy* are prefixed, as *oxysulphate of iron*, *oxynitrate of silver*, *oxymuriate of mercury*, &c. a generic term, which can be properly applied only to denote the compounds of oxymuriatic acid with salifiable bases.

The prefixing the terms *sub* and *super* to denote the quantity of acid below or above the point of perfect neutralization in any salt, is not objectionable in a chemical point of view: but for medicinal purposes this mode of distinguishing salts which have the most marked difference in their active properties, by the alteration or the addition of a syllable only, may be productive of the worst consequences: and therefore it is the more remarkable, that the latter terms are employed in all the British pharmacopœias to denote preparations betwixt which there is very little relationship, and which cannot be converted into each other by any subtraction or addition of acid. The illustration of these observations will be found under the individual Preparations.

Many of the metallic salts are altered by exposure to the atmosphere; some effloresce and attract oxygen; some are altered in their properties by moisture; and others are reduced by the action of light: hence, all of them ought to be kept in well stopped glass bottles; and perhaps these always should be either made of green glass, or otherwise rendered opaque. In compositions which require these salts to be dissolved in water, *distilled* or *filtered rain-water* should always be employed, and much attention is requisite to avoid combining them with incompatible substances, which may either chemically decompose them, or alter their medicinal properties.

Sulphur also combines with the metals and their oxides; but its affinity for the former is greater, and hence there are more *metallic sulphurets* than *sulphuretted metallic oxides*. Metallic sulphurets are also formed, when sulphuretted hydrogen gas is thrown into the acid solutions of those metals which have a weak affinity for oxygen: and, as the metallic solutions differ greatly in the degree of facility with which they are thus decomposed, sulphuretted hydrogen gas may be employed, as Proust has shown, for separating different metals held together in the same solutions. The metallic sulphurets are more used for pharmaceutical purposes than as remedies, their dose not being easily appreciated, and their effects uncertain.

PREPARATIONS OF ANTIMONY.

SULPHURETUM ANTIMONII PRÆPARATUM.

Edin.¹ *Prepared Sulphuret of Antimony.*

“Put sulphuret of antimony, rubbed to powder in an iron mortar, and levigated with a little water, upon a porphyry stone, into a large vessel; then pour water on it, and, after frequently agitating the vessel, pour it off loaded with the fine powder.

“The coarse powder, which the water cannot suspend, is to be again levigated, and treated in the same manner.”

Dublin.

“Let it be reduced to powder, and separate for use the very fine particles, in the manner directed for the preparation of chalk.”

This mechanical preparation is intended to fit the sulphuret for internal use.

Qualities.—Prepared sulphuret of antimony is an inodorous, insipid, blackish, or deep leaden gray dull powder, which stains the fingers, and is insoluble in water.

Medical properties and uses.—It is inert, unless it meets with acid in the stomach, in which case it usually operates either as a diaphoretic or mild cathartic, but occasionally produces excessive vomiting and purging; and hence it is proper to evacuate the stomach and bowels previous to its use. It has been found efficacious in scrophula, chronic rheumatism, and herpetic eruptions. The dose is from grs. v to ʒj, mixed with honey or any convenient vehicle.

Official preparations. *Oxydum Antimonii.* L. D. *Antimonii Sulphuretum præcipitatum.* L. E. D. *Pulvis antimonialis.* L. E. D.

ANTIMONII OXYDUM. Lond. *Oxide of Antimony.*

“Take of tartarized antimony, *one ounce*; subcarbonate of ammonia, *two drachms*; distilled water, *as much as is requisite*. Dissolve the salts separately in the water, then mix the solutions, and boil the mixture until the oxide of antimony is precipitated. Having poured off the water, wash the precipitate with repeated additions of water, and dry it.”

In this process, the ammonia of the subcarbonate decomposes the tartrate of antimony, and forms, with its tartaric acid and the tartrate of potash, a ternary salt, which remains in solution in the water employed, while the oxide of antimony is precipitated. This precipitate is a white protoxide of antimony,

¹ *Sulphure d'Antimoine* (F.) *Schwazer Schwefelspeiss-glanz* (G.) *Solfuro d'antimonio depurato* (I.) *Kohul* (Arab.) *Surmah* (Hind.)

the medium oxide of Thenard, containing 0.20 of oxygen in 100 parts.

Use.—This preparation is violent in its action, and thence should be exhibited with caution: but, as a remedy, it is not ever likely to be much employed; and as it is not essential for the composition of any other preparation, it might be dispensed with.

ANTIMONII SULPHURETUM PRÆCIPITATUM. Lond. *Præcipitated Sulphuret of Antimony.*

“Take of sulphuret of antimony in powder, *two pounds*; solution of potash, *four pints*; distilled water, *three pints*. Mix them, and boil the mixture over a gentle fire for three hours, assiduously stirring it, and occasionally adding distilled water, so that the same measure may be kept up. Strain the solution directly through a doubled linen cloth; and, while it is still hot, drop in gradually as much sulphuric acid as may be necessary for precipitating the powder; then wash away the sulphate of potash with hot water, dry the precipitated sulphuret of antimony, and rub it to a fine powder.

SULPHURETUM ANTIMONII PRÆCIPITATUM. Edin.

“Take of solution of potash, *four parts*; water, *three parts*; prepared sulphuret of antimony, *two parts*; diluted sulphuric acid, *a sufficient quantity*. Mix the sulphuret with the solution of potash and the water, then boil them in a covered iron pot over a gentle fire for three hours, frequently stirring with an iron spatula, and adding water as it may be required. Strain the hot liquor through a doubled linen cloth, and add to it when strained as much diluted sulphuric acid as may be necessary for precipitating the sulphuret, which must be well washed with warm water.”

SULPHUR ANTIMONIATUM FUSCUM. Dub. *Brown antimoniated Sulphur.*

“Take of subcarbonate of kali, prepared sulphuret of antimony, each *one ounce*. Having mixed them, melt the mixture in a crucible, and when it is cold, reduce it into powder. Put it into a matrass with four pints of water, and boil for a quarter of an hour; then remove the vessel from the fire, and cover it; let it rest a little; and when the liquor becomes limpid, cautiously decant it from the sediment. The antimoniated sulphur will partly separate as the liquor cools; add as much diluted sulphuric acid as will precipitate the whole of it, which takes place

¹ Formerly, *Sulphur Antimonii præcipitatum*, *Sulphur auratum Antimonii*. In strict compliance with the principles of the new nomenclature, the present name should be *Hydrosulphuretum Oxidi Antimonii*.—Murray. Soufre doré d'antimoine (F.) Gelber Spiegelschwefel (G.) Zolfo dorato di antimonio (I.)

with an excess of acid: then agitate the mixture, in order that the latter precipitate (which is of an orange colour) may be mixed with the rest; and after allowing it to subside, pour off the liquor from the sediment, which is to be washed with cold water as long as litmus indicates the presence of acid in the effused fluid. Finally, dry it upon bibulous paper."

Although the last of these formulæ differs from the two former, their products are the same,—a sulphuretted hydrosulphuret of oxide of antimony. The following is the theory of its formation. During the boiling, the potash combines with the sulphur of the sulphuret of antimony, and forms sulphuret of potash; which decomposing part of the water, and attracting its disengaged hydrogen, is partly converted into a sulphuretted hydrosulphuret of potash, while its oxygen, aided by the sulphuretted hydrogen, oxidizes the antimony, which is dissolved by the sulphuretted hydrosulphuret of potash. The sulphuric acid, which is now added to the strained solution, combines with the potash, disengaging sulphuretted hydrogen gas, and the oxide of antimony is precipitated combined with the disengaged sulphur and the remaining sulphuretted hydrogen. In the Dublin process, the precipitate thrown down whilst the decanted liquor cools is a powder of a brick-red colour, the well-known *kermes mineral*, which is the oxide of antimony in union with such portions of sulphur and sulphuretted hydrogen only as it can attract; while the precipitate, afterwards thrown down by the acid, is the old *Sulphur auratum Antimonii*, or a hydrosulphuret of antimony with an excess of sulphur; and hence, by agitating the mixture, a compound, or intermediate product, is obtained, which is the sulphuretted hydrosulphuret of the oxide, as in the former cases. According to Thenard, the oxide in these two powders is in a different state of oxidation; an opinion, however, which is at least very problematical. The following are the proportions of their constituents given by him: *Kermes mineral* consists of 72.760 parts of brown oxide of antimony, 20.298 of sulphuretted hydrogen, 4.156 of sulphur, and 2.786 of water and loss: *Golden Sulphur of Antimony* contains 68.30 of orange oxide of antimony, 17.877 of sulphuretted hydrogen, 12.00 of sulphur, and 1.823 of water and loss—in 100 parts.¹ But the real difference appears to consist in the larger portion of sulphur thrown

¹ This powder, although now discarded from the pharmacopœias, was long a celebrated remedy. It was discovered by Glauber, and hence named *Panacea Glauberiana*; and the process kept secret until the French Government published it in 1720, having purchased it from one La Legerie, a surgeon, to whom it had been communicated by a pupil of Glauber.

² *Annales de Chimie*, xxxii. 268.

down with the *golden sulphur*; the base being the same in both, as stated by Trommsdorff.¹

Qualities.—The precipitated sulphuret of antimony, as it is called, is an orange-coloured powder, slightly styptic to the taste, inodorous, and insoluble in water. It readily catches fire, and burns with a blue and greenish flame, exhaling the odour of sulphurous acid, and leaving the metal, after the combustion, in the form of a grayish white oxide.

Medical properties and uses.—This preparation of antimony is diaphoretic and expectorant. It was formerly much employed in asthma, and in catarrhal affections; but it is uncertain in its operation, and is not much employed in modern practice; unless when combined with mercurials, when it forms a useful alterative in herpetic and other eruptions. The dose is from gr. j. to grs. iv. in a pill, twice a day.

Official preparation. *Pilula Hydrargyri submuriatis comp. L.*
ANTIMONIUM TARTARIZATUM. Lond. *Tartarized Antimony.*²

“Take of powdered sulphuret of antimony, *two ounces*; nitrate of potash, *one ounce*; supertartrate of potash, *two ounces*; sulphuric acid (by weight), *two ounces*; distilled water, *one pint and a half*. Mix the acid with the water in a glass vessel, and heat the mixture in a sand-bath. When it is moderately warm, add by degrees the sulphur and the nitre previously mixed together, then strain, and boil until all the moisture is consumed. Wash the residue with distilled water, until it remains tasteless, and while it is yet moist mix with it the supertartrate of potash, and throw the whole into a pint of distilled water; finally boil the solution and set it aside to crystallize.”

TARTRAS ANTIMONII; olim, TARTARUS EMETICUS. Edin.
Tartrate of Antimony, formerly *Tartar Emetic*.

“Take of sulphuret of antimony, and nitrate of potash, each, an *equal weight*; supertartrate of potash, a *sufficient quantity*. Triturate separately the sulphuret and the nitre, and having mixed them well together, throw them into a red-hot crucible. When the deflagration is finished, separate the red matter from the white crust, and rub it into a very fine powder, which must be washed with several effusions of warm water; and afterwards dried.

“This powder is now to be rubbed together with an equal weight of supertartrate of potash, and the mixture boiled in a glass vessel, with four times its weight of distilled water for

¹ *Annales de Chimie*, xxxiv. 132. The quantity of the sulphuretted hydrosulphuret is much increased, by adding to the sulphuret of antimony a small portion of sulphur.

² Tartrate de potasse antimonie (F.) Spiessglanz-weinstein (G.) Tartaro Antimonio (I.)

an hour; then strained through paper, and the strained solution set aside to deposit crystals by evaporation."

TARTARUM ANTIMONIATUM, sive EMETICUM. Dub. *Antimoniated or Emetic Tartar.*

"Take of nitro-muriatic oxide of antimony, *two ounces*; crystals of tartar, rubbed to a very fine powder, *two ounces and a half*; distilled water, *eighteen fluid ounces*. Boil the water in a glass vessel; then gradually throw into it the oxide and the tartar previously mixed together, and boil the mixture for half an hour; then filter the solution through paper, and allow it to crystallize by slow cooling."

By all these methods a little modified crystallized tartar emetic may be prepared. With regard to the formula of the London College, the instructions for conducting the process are such as are likely to mislead any one not much accustomed to think on chemical phenomena. Thus it is not perfectly apparent whether the fluid which passes the filter, or the residue which remains on it, is to be boiled to dryness. The direction as I have stated in another quarter¹ should be "tum cola, et reliquum super chartam bibulam calore exsicca, &c." After repeated trials we have found the following circumstances necessary to be attended to to insure success. In the first place the sulphuret of antimony must be very finely pulverized in an iron mortar, then well mixed with the nitrate of potash, also reduced to a fine powder, and the mixed powders added by degrees to the mixture of the acid, with the whole of the water heated to 180°, and kept in this temperature for some time after all the powder has been added; the supernatant fluid is then to be decanted off, and the residuum washed with distilled water until the fluid comes off tasteless. We have found no advantage from drying the residuum; but while it is yet moist with the last washing, the supertartrate of potash should be added; and after stirring them well together, the whole thrown into a pint of distilled water. The mixture is then to be boiled for half an hour, filtered whilst it is hot, and the fluid set aside in a flat vessel to crystallize. When the solution has been boiled too long, the crystallization is very irregular.

The following is the probable theory of the changes which take place during the process we have described:—The nitrate of potash is decomposed by the sulphuric acid, as is demonstrated by the extrication of nitrous gas; and part of its oxygen being expended upon the oxide of the sulphuret. This is converted into protoxide of antimony; while, perhaps also at the same time, the sulphur is partly converted

¹ *Lond. Med. Repository*, vol. iv. p. 131.

into an acid. Sub-sulphate of antimony is then formed by the action of part of the acid on the protoxide, which has a grayish appearance when washed, and is in a state fit to be acted upon by the tartaric acid of the supertartrate of potash, and form the ternary salt.

The theory of the other two processes is sufficiently obvious. The superabundant acid of the supertartrate of potash combines with the oxide of antimony, forming a triple salt, or a tartrate of antimony and potash; which, on the principles of the reformed nomenclature, should be the pharmaceutical name of this salt.

It must be regretted that all the Colleges have not concurred in adopting the same preparation of antimony for the formation of this important salt.

Qualities. — Tartrate of antimony and potash is procured in small rectangular trihedral crystals, of a white colour, inodorous, nearly insipid, and efflorescent. It should be bought in crystals; and to ascertain its purity, a few of these should be put into a dilute solution of *ammoniac sulphuretum*, when their goodness may be judged of by the quantity of orange-coloured precipitate that forms. It is soluble in about 15 parts of water at 60°, and in 2 parts at 212°, forming when the salt is good a perfectly clear transparent solution. It is spontaneously decomposed when kept in aqueous solution; and is also decomposed by heat, the strong acids, the alkalis and alkaline carbonates, the earths, hydrosulphurets, some of the metals, and by the decoctions or infusions of many bitter and astringent vegetables, with which therefore it ought never to be conjoined in extemporaneous prescription. According to the analysis of Thenard¹, its constituents are 35.4 of tartaric acid, 39.6 of oxide, 16.7 of potash, and 8.3 of water; but these proportions must necessarily vary with the different modes of preparation.

Medical properties and uses. — This triple salt is emetic, diaphoretic, expectorant, alterative, and rubefacient; and it operates also sometimes as a cathartic. It is certainly the most important of the antimonial preparations, and when the dose is properly apportioned may supersede the use of all the others. It is given as an emetic in the commencement of fevers, in doses of from one to two grains dissolved in distilled water. To obtain its diaphoretic effect, the dose is from $\frac{1}{16}$ th to $\frac{1}{4}$ th of a grain; and the same or a smaller dose combined with squill, ammoniacum, and camphor, and repeated every three hours, operates as an expectorant. In very minute doses combined with calomel, it is a powerful al-

¹ *Annales de Chimie*, xxxviii. 39.

ternative in many cutaneous diseases; and when ʒij of it are triturated with ʒj of lard into an ointment, and applied to the skin, it occasions a local pustular eruption, and hence has proved very serviceable in mania, white swellings, and deep-seated inflammations as a counter irritant.

When taken in large doses tartar-emetic acts as a corrosive poison, producing violent vomiting, hiccup, a sensation of burning in the stomach, colic, hypercatharsis, syncope, difficult respiration, convulsions, and death. The treatment, when assistance is demanded in time, consists in carrying the poison out of the stomach by bland, oily liquids freely taken; after which decoction of yellow bark should be freely administered, with opium and local bleedings.

Official preparations. *Liquor Antimonii tartarizati*. L. *Vinum Tartritis Antimonii*. E.

LIQUOR ANTIMONII TARTARIZATI. Lond. *Solution of Tartarized Antimony.*¹

“Take of tartarized antimony, *a scruple*; boiling distilled water, *four fluid ounces*; wine, *six fluid ounces*. Dissolve the tartarized antimony in the boiling distilled water; then add the wine.”

VINUM TARTRATIS ANTIMONII. Edin. *Wine of Tartrate of Antimony.*

“Take of tartrate of antimony, *twenty-four grains*; Spanish white wine, *one pound*. Mix, so that the tartrate of antimony may be dissolved.”

These solutions, when newly made are equal in point of strength, fʒj of each containing grs. ij . of tartarized antimony; but the London preparation soon becomes considerably weaker, the large proportion of water employed facilitating the spontaneous decomposition of the salt, which falls to the bottom of the vessel in which the solution is preserved, in the form of a grayish powder. The same circumstance occurs in a smaller degree in the Edinburgh preparation; and therefore the intention of these processes (the obtaining a solution of a determinate strength to afford a ready mode of administering tartarized antimony in very minutely divided doses) is thus in some respects frustrated. The precipitate appears to be an oxide of antimony, with a portion of super-tartrate of potash; arising, perhaps from the potash attracting tartaric acid from the wine, and thus breaking the affinity which retains it as a component of the antimonial salt.

Medical properties and uses. — These solutions are diaphoretic or emetic, according to the extent of the dose. In doses of mxx to fʒj in any proper vehicle, repeated every three or

¹ *Vinum Antimonii tartarizati*. P. L. 1787.

four hours, it usually excites diaphoresis, and is given with this view in the same complaints as the tartarized antimony; but it is principally used as an emetic for infants, a teaspoonful being given every five minutes until vomiting be excited.

PULVIS ANTIMONIALIS. Lond. *Antimonial Powder.*

“Take of sulphuret of antimony in powder, a pound; hartshorn shavings, two pounds. Mix, and throw them into a broad iron pot heated to whiteness, assiduously stirring until the mixture acquire an ash-colour. Take them out, and pulverize them; and then put them into a coated crucible, over which another crucible having a small hole in its bottom is to be inverted and luted. Then place it over the fire, which is to be gradually raised, so that it may continue at a white heat for two hours. Triturate the residue into very fine powder.”

OXIDUM ANTIMONII CUM PHOSPHATE CALCIS; olim, PULVIS ANTIMONIALIS. Edin. *Oxide of Antimony with Phosphate of Lime*; formerly *Antimonial Powder.*

“Take of sulphuret of antimony in coarse powder, hartshorn shavings, each equal parts. Mix, and throw them into a wide iron pot heated to redness, and stir them assiduously until they are burnt into a matter of a gray colour, which remove from the fire, rub to powder, and put into a coated crucible, over which another crucible having a small hole in its bottom is to be inverted and luted: then apply the fire, which is to be gradually raised to a white heat, and kept at this increased heat for two hours. Finally, reduce the matter when it is cold to a very fine powder.”

PULVIS ANTIMONIALIS. Dub. *Antimonial Powder.*

“Take of sulphuret of antimony in coarse powder, hartshorn shavings, each two pounds. Boil the hartshorn in a sufficient quantity of water to separate the gluten; then dry it, and mix it with the antimony. Throw the mixture into a wide iron pot heated to redness, assiduously stirring until the sulphurous vapours cease to be extricated, and the matter acquire a gray colour. Rub the mass to powder when it is cold, and put it into a coated crucible; over which invert another crucible having a small hole in its bottom, and lute the two firmly together. Roast the matter with a heat gradually raised to whiteness for the space of two hours; and lastly, when it is cold, grind it to a very fine powder.”

In these processes, by the first exposure of the materials to the action of heat, the gelatin and the other principles of the hartshorn, except the phosphate of lime, are decomposed and dissipated; the sulphur of the sulphuret of antimony is at the same time expelled, and the metal is partially oxidized, the

oxidizement being favoured by the shape of the vessel and frequent stirring. By the subsequent application of heat, the oxidizement of the metal is rendered more complete, and the oxide is partially vitrified; but whether the phosphate of lime is merely mechanically mixed with the oxide, or the lime yields up part of the phosphoric acid to it, and a ternary compound of phosphate of lime and antimony be thus produced, is uncertain. From the experiments of Chenevix, however, the former supposition seems to be more probable. In the Dublin formula the boiling of the hartshorn shavings ordered is unnecessary, as the heat effectually decomposes the gelatin, which is the only part of them that can be extracted by the boiling. The change in the proportions of the ingredients, and consequently the strength of the preparation, ordered in the present London Pharmacopœia, is to be regretted. Indeed we cannot discover how the change can render the exhibition of it more manageable¹; and an active preparation, which has long been used, and found to answer the intentions for which it is prescribed, ought not to be hastily altered for any trivial advantage supposed likely to result from the alteration.

From the uncertainty of uniformity in a preparation by the agency of fire, Mr. Chenevix has proposed the substitution of a powder prepared according to the following formula: Let equal parts of white oxide of antimony and of phosphate of lime be dissolved in the smallest possible quantity of muriatic acid, and pour the solution into a sufficient quantity of distilled water containing pure ammonia in solution. A powder precipitates, which is a mechanical mixture of submuriate of antimony and phosphate of lime.² The process by heat, however, is still continued in the pharmacopœias, from a desire of imitating, as closely as possible, the celebrated empirical preparation of Dr. James, "James's Powder," as a substitute for which this preparation was first introduced; and which, according to the analysis of Dr. Pearson, consists of 43 parts of phosphate of lime, and 57 of oxide of antimony, in 100 parts.³

Qualities.—The antimonial powder of the pharmacopœias is inodorous and insipid, of a dull white colour, insoluble in water, and only partially soluble in acids; in this particular differing from the powder of Chenevix, which is soluble in every acid that can dissolve either of its components.

¹ Powel's Translation of the London Pharmacopœia, 107. ² Phil. Mag. xi. 110.

³ Phil. Trans. lxxxi. 317. Another analysis of this powder has been published lately by M. Pully, an Italian chemist, who gives the following as its constituents: seven parts of protoxide of antimony, four of phosphate of lime, four and a half of sulphate of potash, and three and a half of potash, holding in solution protoxide of antimony. *Annales de Chimie*, lv. 74. *Thomson's Chemistry*, 4th ed. iii. 315.

Medical properties and uses. — The antimonial powder operates as a diaphoretic, alterative, emetic, or purgative, according to the extent of the dose, and the state or habit of the patient to whom it is administered. It is the preparation of antimony most commonly employed in the commencement of fevers, and in inflammatory affections; being generally given with a view to its diaphoretic effect: and when a copious perspiration is early induced, after having previously evacuated the stomach and bowels, fevers of the most threatening aspect are often cut short by it; but when it fails in producing this effect, the protracted use of it may prove hurtful, particularly if the fever assume the typhoid character. The purging, however, which it is apt to induce in typhus, has been, perhaps, too much dreaded; and we have seen good reasons to subscribe to the opinions published by Dr. Hamilton¹, on the use of purgatives in this kind of fever. Those labouring under inflammatory diseases, who can bear considerable discharges by stool, experience the most benefit from the use of the antimonial powder, particularly when venæsection has been previously employed. In acute rheumatism it is advantageously given, combined with camphor, calomel, and opium; and with calomel and guaiacum in several cutaneous affections. As it is insoluble in water, it is given either in the form of a powder, or made up in pills. The dose is from grs. iij. to grs. viij, repeated every fourth hour, diluting freely in the intervals, until its effects are obtained.

PRÆPARATUM EX ARGENTO.

PREPARATION OF SILVER.

ARGENTI NITRAS. Lond.² *Nitrate of Silver.*

“Take of silver, *an ounce*; nitric acid, *one fluid ounce*; distilled water, *two fluid ounces*. Mix together the nitric acid and water, and dissolve the silver in the mixture on a sand-bath. Then gradually increase the heat, that the nitrate of silver may be dried. Melt this in a crucible on a gentle fire, until, the water being evaporated, the ebullition cease: then directly pour it into proper moulds.”

¹ *Observations on the Utility of Purgative Medicines*, p. 14. 23.

² *Argentum nitratum*, P. L. 1787. *Nitrate d'Argent* (F.) *Salpetersaures Silber* (G.) *Nitrato di argento* (I.)

NITRAS ARGENTI. Edin. *Nitrate of Silver.*

“Take of pure silver flatted into plates and cut, *one part*; nitric acid diluted, *two parts*; distilled water, *one part*. Dissolve the silver in the acid and water previously mixed together, in a phial 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 must be at first gentle, and gradually increased until the mass flows like oil; then pour it into iron pipes previously heated and rubbed with grease. Finally, let the preparation be preserved in a well stopped glass vessel.”

Dublin.

“Take of silver flatted into plates and cut; nitrous acid, each *one ounce*; distilled water, *two fluid ounces*. Put the silver in a glass vessel placed in a sand-bath; and pour over it the acid previously diluted. Then dissolve the metal with a gradually raised heat, and evaporate the solution to dryness. Put the mass which remains into a crucible, and dissolve it over a slow fire; finally, let it be poured into proper moulds, and preserve it in a well stopped glass vessel.”

In this process the acid is partly decomposed by the silver which is oxidized, and the oxide dissolved as it forms, in the remaining acid. The effervescence is very violent, owing to the extrication of the nitrous gas of the decomposing acid, which flies off in orange-coloured fumes, part of them, however, is retained in the solution, and gives it a blue greenish colour, which goes off as it cools. In this stage of the process, the silver held in solution is in the state of an oxynitrate, which, by due evaporation, may be obtained in brilliant, irregular, thin, six-sided plates, having an intensely bitter taste: and although by the subsequent melting a part of the acid is expelled, yet it is probable that the product is not reduced to the state of a subnitrate.

The difference in the quantity of acid ordered in the different formulæ does not alter the nature of the product; but it is of some consequence, in an economical point of view, to know, that even in the Dublin formula, which orders equal parts of silver and acid, the quantity of acid is too great, ten fluid drachms being amply sufficient for the solution of two ounces of silver. Several minute particulars are necessary to be attended to in conducting the process. The silver must be perfectly free from any alloy of copper, which renders the salt always more or less deliquescent. Its presence is indicated when the solution remains of a permanently greenish blue colour: in which case it may be purified by repeated solutions

and crystallizations, as long as tabular crystals are produced, the nitrate of copper being left in the mother-water. The acid employed must also be pure; for, if muriatic or sulphuric acids be present, the solution is rendered turbid by the formation of a precipitate of sulphate and muriate of silver; which however, when only in small quantity, does not impede the process, and is easily separated by simple subsidence, after the nitric acid is fully saturated. For the same reasons the water must be pure; and therefore distilled water, or filtered rain water, should be employed. The granular form of the silver is preferable to the laminated form ordered by the Colleges. For the subsequent evaporation and melting, a porcelain crucible should be used, as the fused silver is apt to sink into the substance of the common crucibles: and it should be of ample size to allow of the swelling and ebullition. The heat must not be continued after the fusion is complete; for by continuing the application of heat, the nitric acid is expelled, and the silver partially reduced; but it should be directly run into the moulds, which may be made of iron; or, in a mass of well-tempered pipe-clay, holes of the size required may be perforated by means of a greased quill, and the fused nitrate run into them. When cold, each piece must be cleaned from the grease, and separately rolled up in clean white paper.

Qualities.—Fused nitrate of silver is in small solid cylinders of a dark gray colour, and presenting, when broken across, a crystallized structure. It is inodorous, has an intensely bitter, metallic, caustic taste, and tinges the skin and hair black wherever it touches, owing to the reduction of the nitrate by the extension of it on the cuticle. It is not deliquescent. It is soluble in an equal weight of water at 60°, and is also soluble in alcohol. It is blackened and reduced by exposure to light or a strong heat, by phosphorus, hydrogen gas, and the hydrosulphurets; is precipitated from its aqueous solution by mercury, copper, and some other metals; and is decomposed by the alkalies, with the exception of ammonia, the alkaline earths, sulphuretted hydrogen, the hydro-sulphurets, the sulphuric, muriatic, and arsenious acids, the majority of the neutral salts, and by astringent vegetable solutions. The constituents of 100 parts are, 64 of silver, 6 of oxygen, and 30 of nitric acid.

Medical properties and uses.—Nitrate of silver is tonic, antispasmodic, and escharotic. It was introduced as an internal remedy by Angelus Sala, in the commencement of the 17th century. It is said to prove efficacious in epilepsy, and its utility in angina pectoris, and chorea, is well known. In these cases it is given in doses of $\frac{1}{4}$ th of a grain, gradually increased to grs. iv.

or more, three times a day; but little advantage is gained, unless its use be preceded, by a course of purgatives. The best form of administering it is that of pill made with crumb of bread. But the chief use of nitrate of silver is as an external application to destroy strictures of the urethra, warts, fungous excrescencies, and incipient chancres. In solution, in the proportion of gr. ij to fʒj of distilled water, it forms a good injection in fistulous sores; and a lotion in that disease of the gums generally denominated scurvy, in which the gum becomes spongy, and its edges hang loosely about the necks of the teeth. When this latter disease, however, rises to a great height, the sore edges of the gum should be touched with a hair pencil dipped in a much stronger solution, in the proportion of ʒj of the nitrate of silver to fʒj of distilled water.¹ A solution of one part of the nitrate in 1000 parts of water is recommended by Hahnemann² as an application to old sores, and for healing the ulcers of the mouth produced by the use of mercurials.

When given in too large doses, it acts as a poison on the system, producing symptoms resembling those induced by the other corrosive poisons. M. Orfila regards common salt as the antidote of this poison, when given sufficiently early to prevent the specific action of the nitrate on the coats of the stomach³; but at the same time, local and general bleeding, tepid baths, and emollient fomentations and glysters must be employed, if any symptom of abdominal inflammation be perceived.

PRÆPARATA EX ARSENICO.

PREPARATIONS OF ARSENIC.

ARSENICI OXYDUM SUBLIMATUM. Lond.⁴ *Prepared Oxide of Arsenic.*

"Reduce oxide of arsenic to powder; then put it into a crucible, and, applying heat, sublime it into another crucible inverted over the first."

The greater part of the oxide of arsenic found in the shops, is in the form of semivitreous cakes, which are the product of a second sublimation of the oxide, after it is obtained from

¹ Fox on the Natural History and Treatment of Diseases of the Teeth.

² *Annales de Chimie*, iii. 308.

³ *Traité des Poisons*, &c. tom. i. p. 49.

⁴ Oxide d'arsenique pure (F.) Weisses Arsenick (G.) Arsenico bianco (I.)

roasting ores of cobalt. Although prepared on a great scale, yet it is as pure as sublimation can make it, and therefore this process is superfluous; and as it is also not devoid of risk to the operator, it should be altogether rejected.

LIQUOR ARSENICALIS. Lond. *Arsenical Solution.*

“Take of prepared oxide of arsenic rubbed to a very fine powder, subcarbonate of potash from tartar, each *sixty-four grains*; distilled water, *a pint*. Boil them together in a glass vessel until the arsenic be entirely dissolved. Add to the solution when it is cold compound spirit of lavender, *four fluid drachms*; and then as much distilled water as will make the whole up to a pint.”

SOLUTIO ARSENICALIS. Edin. *Solution of Arsenic.*

“Take of oxide of arsenic rubbed to very fine powder, very pure subcarbonate of potash, of each *sixty-four grains*; distilled water *fourteen ounces*. Boil them together in a glass vessel until all the oxide be dissolved. Add to the solution, when it is cold, *half an ounce* of compound spirit of lavender, and as much distilled water as will make the whole up to sixteen ounces.”

The white oxide of arsenic possesses properties in some respect similar to those of an acid. It combines with alkalies, is soluble in water, and the solution reddens tincture of litmus: but it also combines with and neutralizes the acids; so that, while some¹ regard it as an acid, others² consider it only as a highly oxidized oxide. In the above process, by combination with the potash, its solubility is much increased, and a solution obtained of an uniform strength, by which very minute doses can be correctly and easily apportioned. It was introduced by Dr. Fowler of Stafford, whose formula the London College has adopted, altering only the proportions of the water and the spirit of lavender, to make up the pint of the solution.

Qualities. — This solution, one fluid drachm of which contains half a grain of oxide of arsenic, has the odour, taste, and colour of the compound spirit of lavender. It is decomposed by lime-water and hydrosulphuret of potash, and instantly forms a copious precipitate when dropped into infusion or decoction of cinchona bark; with which, therefore, it ought not to be conjoined in extemporaneous prescriptions.

Medical properties and uses. — The arsenical solution, as it is termed, is a powerful tonic, useful in all the cases in which

¹ This appellation is certainly very objectionable, as it conveys an erroneous idea of the preparation, even admitting that the term *arsenic* may be used to designate the white oxide: it should have been *Liquor Arsenialis Potassæ*, or perhaps more properly, *Liquor alcalinus Oxidi Arsenici*.

² Fourcroy.

³ Berthollet.

the white oxide can be employed. (See *Arsenici Oxydum*, Part ii.) It was introduced by Dr. Fowler as a substitute for the celebrated empirical remedy known under the name of "the ague drop," which owes its efficacy to the oxide of arsenic. In addition to the account we have already given of the medicinal use of the oxide, we have to add that we have given this solution with decided advantage after cupping and purging, in threatened apoplexy when the strength was little and the complexion pale. The dose is $\mathfrak{m}\text{iv}$ gradually increased to $\mathfrak{m}\text{xx}$, given twice a day.

ARSENIAS KALI. Dub. *Arsenate of Kali.*

"Take of white oxide of arsenic, nitrate of kali, each an ounce. Reduce them separately to powder; then having mixed them, put them into a glass retort, and place it in a sand-bath exposed to a gradually raised heat, until the bottom of the retort becomes obscurely red. The vapours arising from the retort should be transmitted through distilled water, by means of a proper apparatus, in order that the nitrous acid extricated by the heat may be disengaged. Dissolve the residue in four pounds of boiling distilled water, and after due evaporation set it apart, that crystals may form."

In this process the nitrate of potash is decomposed by the heat; part of the oxygen of the nitric acid with the whole of its nitrogen escape in the form of nitrous gas, while the remainder of the oxygen is attracted by the oxide of arsenic, which is thus converted into arsenic acid, and combines with the disengaged potash of the nitrate, forming a superarsenate of potash: this remains in the retort in the form of a white saline mass, and is afterwards dissolved and crystallized. The nitrous acid is not worth condensing, as the process is not likely to be performed on a great scale.

Qualities. — Arseniate, or rather superarsenate¹, of potash crystallizes in beautiful, transparent, tetraëdral prisms, having an excess of acid. They are soluble in water; and the solution reddens the vegetable blues.

Medical properties and uses. — This salt may be used exactly in the same manner, and in the same cases as the white oxide. It was discovered by Macquer, and long known under the name of "the arsenical neutral salt of Macquer." The dose is from one-sixteenth to one-eighth of a grain, formed into a pill with crumb of bread.

¹ The arseniate is uncrystallizable and deliquescent, and altogether a different salt; the Dublin College therefore has improperly named it *Arsenias Kali*.

PREPARATA E CUPRO.

PREPARATIONS OF COPPER.

ÆRUGO PRÆPARATA. Dub.¹ *Prepared Verdegris.*

"Let the verdegris be reduced to powder, and the more subtile parts be separated in the manner directed for the preparation of chalk."

By this process the subacetate of copper is obtained in a state of very minute mechanical division, better fitted for internal use, in the cases for which it is sometimes prescribed. (See *Ærugo*, Part ii.)

CUPRUM AMMONIATUM. Lond. *Ammoniated Copper.*²

"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 wrap up the ammoniated copper in bibulous paper, and dry it with a gentle heat."

AMMONIARETUM CUPRI. Edin. *Ammoniuret of Copper.*

"Take of pure sulphate of copper, *two parts*; subcarbonate of ammonia, *three parts*. Rub them thoroughly together in a glass mortar, until all effervescence is finished, and they unite in a violet-coloured mass, which wrap up in bibulous paper, and dry, first on a chalk stone, and afterwards with a gentle heat. Let it be preserved in a well stopped glass phial."

CUPRUM AMMONIATUM. Dub. *Ammoniated Copper.*

"Take of sulphate of copper, *an ounce*; carbonate of ammonia, *an ounce and a half*. Rub them in an earthenware mortar, until all effervescence having ceased, they unite into a mass, which is to be dried, wrapped up in bibulous paper, and preserved in a phial closed with a glass stopper."

The product of these processes is either a triple salt, a subsulphate of oxide of copper and ammonia, or a mixture only of subsulphate of copper, and subsulphate of ammonia³; but the former is the more probable state of the compound, from the difference of capacity which it has for water being so great as to render the resulting mass extremely moist. During the trituration, the sulphate of copper is partially decomposed, and part of its acid yielded up to the ammonia, which is con-

¹ Vert-de-gris (F.) Grünspon (G.) Acetato di Rame (I.) Cardenillo (S.)

² Schwefelsaures Kupfer mit Ammonium (G.) Ammoniuro di Rame (I.)

³ It is certainly not an ammoniuret, although so designated in the Edinburgh Pharmacopoeia.

sequently freed from the carbonic acid, the effervescence being the effect of the dissipation of this disengaged acid in the gaseous form. The action of the affinities, which produce these changes, is perhaps aided by the water of crystallization of the ingredients becoming fluid. In drying the product it must be very carefully excluded from the air.

Qualities.—This preparation has the odour of ammonia, a hot, styptic, metalline taste, and a rich blue colour. By exposure to the air the blue colour is lost, and the salt acquires a greenish hue.

Medical properties and uses.—Ammoniated copper is tonic and antispasmodic. It has been principally employed in epilepsy, as a remedy for which it was first proposed by Dr. Cullen; and has since his time been frequently employed with evident advantage—although we must confess, that in our trials of it the event has not been such as to encourage us to place much dependence on its powers for relieving this severe disease. It is less apt to excite nausea than the other preparations of copper. Cullen, however, recommends its use not to be continued for more than a month at a time; and adds, that after the first interval, if the disease continues, the most benefit will be derived from giving the medicine “only for some days before an expected accession.”¹ It has been given with advantage in chorea, after a course of purgatives, combined with digitalis and myrrh.

The dose is gr. $\frac{1}{4}$ th gradually increased to grs. v. given twice a day, either simply made into pills with crumb of bread, or combined with valerian.

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

“Take of ammoniated copper, a drachm; distilled water, a pint. Dissolve the ammoniated copper in the water, and filter the solution through paper.”

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

“Take of lime-water, eight fluid ounces; muriate of ammonia, two scruples; prepared verdegris, four grains. Let them be mixed together, and digested for twenty-four hours; then pour off the clear liquor.”

As nearly the same result follows whichever of these processes is adopted; that of the London pharmacopœia, from its simplicity, is undoubtedly to be preferred, although too much water is ordered. In the Dublin process, the lime decomposes the muriate of ammonia, and combines with its mu-

¹ *Mat. Med.* ii. 25.

riatic acid, forming a muriate of lime, while the disengaged ammonia unites with the oxide of copper of the verdegris, and forms a soluble compound. It differs from the simple solution of ammoniated copper, in holding also the muriate of lime in solution; and is a stronger preparation, for nearly one-half of the oxide of the ammoniated copper is precipitated by the excess of water.

Medical properties and uses.—This solution is detergent, and mildly escharotic. It forms an useful local stimulant for cleaning foul indolent ulcers, and disposing them to heal; and is also employed, still more largely diluted, for removing specks from the cornea.

SOLUTIO SULPHATIS CUPRI COMPOSITA. Edin.
Compound Solution of Sulphate of Copper.

“Take of sulphate of copper, sulphate of alumina, each *three ounces*; water, *two pounds*; sulphuric acid, *one ounce and a half*. Boil the sulphates in the water, to dissolve them; and then to the liquor filtered through paper add the acid.”

This preparation is a simple solution of the sulphates. It is sometimes used as a styptic for stopping hæmorrhages; and largely diluted as a lotion in ophthalmia tarsi, and the purulent ophthalmia of infants.

As has been already noticed (Part ii.) the best antidote for the salts of copper, when taken as poisons, is sugar.

PRÆPARATA E FERRO.

PREPARATIONS OF IRON.

LIMATURA FERRI PURIFICATA. Edin.¹ *Purified Filings of Iron.*

“Having placed a sieve over the filings, apply a magnet, so that it may draw the filings upwards through the sieve.”

The iron filings obtained from the workshops are always mixed with many impurities, and often with filings of copper and other metals. It requires some address to purify them by this process; at least the sieve must not be placed too close upon the filings, but as distant as the sphere of attraction of the magnet will admit of, so that the iron only may be raised.

OXIDUM FERRI NIGRUM PURIFICATUM. Edin.²
Purified Black Oxide of Iron.

¹ Limaille de Mars (F.) Gepulvertes Eisen (G.) Limatura di Ferro (I.) Eerumboc Podia (Tam.)

² L'oxide noir de Fer (F.) Schwarzes gesäuertes Eisen (G.) Ossido nero di Ferro (I.)

“ Let the scales of the black oxide of iron, found at the anvil of the blacksmith, be purified by the application of the magnet; for the magnet attracts the thinner and purer scales only, leaving the larger and less pure.”

OXYDUM FERRI NIGRUM. Dub. *Black Oxide of Iron.*

“ Let the scales of iron, found at the blacksmith's anvil, be purified by the application of the magnet. Then reduce them to a powder, the finest parts of which are to be separated in the manner ordered for the preparation of chalk.”

The scales struck off from red-hot iron by the hammer of the blacksmith are imperfectly oxidized, but still retain their magnetic quality in a sufficient degree to admit of being purified in the above manner.

Medical properties and uses. — This imperfect oxide is tonic, deobstruent, and anthelmintic. It is efficaciously administered in general debility, dyspepsia, chlorosis, and worm cases. Its utility is determined by its meeting with acid in the stomach, which is known to be the case by the disagreeable eructations it produces, and the black colour of the alvine evacuations. The dose is from grs. v to ʒj, combined with any aromatic powder, or formed into an electuary with honey, and taken twice a day.

FER'RUM AMMONIATUM. Lond. *Ammoniated Iron.*

“ Take of subcarbonate of iron, muriate of ammonia, each a pound. Mix them accurately together, and instantly sublime, by the application of a strong heat; finally, reduce them to powder.”

MURIAS AMMONIÆ ET FERRI. Edin. *Muriate of Ammonia and Iron.*

“ Take of the red oxide of iron washed and again dried, muriate of ammonia, each equal parts by weight. Mix them well together, and sublime by a quick fire. Reduce the sublimation to powder and preserve it in a well stopped phial.”

MURIAS AMMONIÆ ET FERRI. Dub. *Muriate of Ammonia and Iron.*

“ Take of red oxide of iron, muriate of ammonia, each equal parts by weight. Having mixed them well together, sublime them with a sudden and sufficiently strong heat.”

Of these processes, those of the Edinburgh and Dublin Colleges are to be preferred, for the reasons below stated. The theory of the operation is obvious: the sudden application of an intense heat enables the oxide of iron to decompose the muriate of ammonia, and to unite with part of its muriatic acid,

¹ Ferrum ammoniacale, P. L. 1787. Fleurs de Mars ammoniacales (F.) Eisenhaltiges Salzsäures Ammonium (G.)

and at the same time it probably enters into that degree of combination with the ammonia, which exists in triple salts, the product being either a muriate of iron and ammonia, or a mixed mass of submuriate of ammonia, and submuriate of iron: some difference, however, takes place when the carbonate of iron, ordered by the London College, is employed; for, a portion of subcarbonate of ammonia being formed, which does not combine with the iron, the formation of *ferrum ammoniatum* is limited: and the sublimed product, instead of being wholly composed of this salt, is only a mixture of it with subcarbonate of ammonia. The strength of the preparation depends very much on the degree of heat employed, and the quickness of the sublimation.

Qualities. — Muriate of ammonia and iron has an odour, resembling, in some degree, that of saffron, and a styptic taste. It is in crystalline grains of an orange colour; soluble in alcohol, and deliquescent; on which account this salt requires to be preserved in very well stopped phials."

Medical properties and uses. — This preparation of iron is tonic, emmenagogue, and aperient. It was formerly much used in epilepsy, hysteria, chlorosis, scrophula, and rickets; but on account of the uncertainty of the preparation it is now seldom prescribed. The dose is from grs. iij. to grs. xv. given twice or thrice a day.

Official preparation: *Tinctura Ferri ammoniati. L.*

SUBCARBONAS FERRI PRÆPARATUS. Edin.
Prepared Carbonate of Iron.*

"Let purified filings of iron be frequently moistened with water, till they fall into rust, which is to be rubbed to powder."

FERRI RUBIGO. Dub. *Rust of iron.*

"Take of iron wire, *any quantity.* Cut it into small pieces, which are to be exposed to the air, and frequently moistened with water, until they be converted into rust; let this be rubbed in an iron mortar, and by pouring water on it, wash over the finest part of the powder, which is to be dried."

In these processes the iron is oxidized at the expense of the water which is decomposed, while at the same time carbonic acid is attracted from the atmosphere, and combined with the oxide. The product is a subcarbonate of oxide of iron, for the quantity of acid is not equivalent to the neutralization of the oxide.

According to my experiments, it consists of 85 parts of oxide of iron, and 15 of carbonic acid; but these proportions must

* Carburé de Fer (F.) Rost (G.) Ossido carbonato di Ferro (I.) Sudud ul hidud (Arab.) Eerumbo tuppoo (Tam.)

necessarily vary from variations in the conduct of the process.

Qualities.—It is inodorous, has a styptic taste, and a reddish-brown colour; dissolves in acids with effervescence; and is decomposed by heat.

Medical properties and uses.—The rust of iron is tonic and emmenagogue. Next to the black oxide it is the least active of the preparations of this metal. It has lately been recommended with much confidence, both as an internal remedy, and an external application in cancer.* In large doses it often occasions uneasiness at the stomach; yet Cullen says, "We have always found the simple rust as effectual as any other preparation; and the stomach bears it better than any other." It is given in the form of pills, combined with aromatics and bitter extracts. The dose is from grs. iv. to ʒj. given twice a day.

Official preparation. *Tinctura Muriatis Ferri. D.*

FERRI SUBCARBONAS. Lond. *Subcarbonate of Iron.*

"Take of sulphate of iron, *eight ounces*; subcarbonate of soda, *six ounces*; boiling water, *a gallon*. Dissolve separately the sulphate of iron and the subcarbonate of soda in eight pints of water; then mix together the solutions, and set the mixture aside, that the powder may subside; then pour off the supernatant fluid, wash the sub-carbonate of iron in hot water, and dry it, wrapped up in bibulous paper, with a gentle heat."

CARBONAS FERRI PRÆCIPITATUS. Edin. *Precipitated Carbonate of Iron.* CARBONAS FERRI. Dub. *Carbonate of Iron.*

"Take of sulphate of iron, *four ounces*; subcarbonate of soda, *five ounces*; water, *ten pounds*. Dissolve the sulphate in the water: then add the subcarbonate previously dissolved in the water, and mix them together. Let the carbonate of iron, which is precipitated, be washed with tepid water, and afterwards dried."

This preparation is also a subcarbonate of iron. By mixing the solutions together, a double decomposition is effected; the sulphuric acid of the sulphate of iron combines with the soda, while the iron attracts the disengaged carbonic acid of the subcarbonate of soda; and hence the products are an insoluble subcarbonate of iron, and a soluble sulphate of soda, which are easily separated by washing and filtration. When first precipitated, the subcarbonate of iron has a deep green colour, and

¹ Carmichael on the Use of Carbonate of Iron in Cancer.

² It is the carbonate of iron which is contained in chalybeate waters, held in solution by the excess of carbonic acid. By exposing these waters to the air, the carbonic acid flies off, oxygen is attracted, and the carbonate falls down in the form of a yellowish sediment.

³ Chalybis præparatus à aceto, et sine aceto, P. L. 1720. Chalybis rubigo præparata, P. L. 1745. Ferri rubigo, P. L. 1787.

is at a minimum of oxidizement; but while drying, it attracts oxygen rapidly from the atmosphere, and is converted into the red oxide, or a peroxide, containing, according to Proust, 48 per cent. of oxygen. I have found that the precipitate combines with the largest proportion of carbonic acid, when the solutions are mixed at a temperature of 150° of Fahrenheit; and filtration is necessary for separating it, the decantation of the clear fluid being very difficult, owing to the lightness of the precipitate. The great solubility of the sulphate of soda renders much subsequent washing unnecessary; and the precipitate, after being washed, should be dried in the paper on which it is filtered, by a heat not exceeding 200°.

Qualities.—Precipitated subcarbonate of iron is inodorous, has a slightly styptic taste; and when properly prepared is of a chocolate-brown colour. It is insoluble in water, but acids dissolve it with effervescence, disengaging the carbonic acid in the gaseous form. It is decomposed by heat, and converted into the black oxide of the metal. In my experiments, ten grains of the dried subcarbonate, prepared with effloresced subcarbonate of soda, lost 2·3 grains, when dissolved in muriatic acid; and the same quantity, prepared with the crystallized alkali, and dried with great care, lost 1·4; so that prepared in the former method, it contained 23 per cent. of carbonic acid, and in the latter 14 per cent.

Medical properties and uses.—This preparation differs little from the former preparation in its effects, except that it sits easier on the stomach. The dose is from grs. iv. to grs. xxx.; given three times a day, combined with myrrh, or aromatics.

Officinal preparations. *Ferrum ammoniatum*. L. *Tartarum Ferri*. D. *Tinctura Ferri Murialis*. L.

FERRI SULPHAS. Lond. *Sulphate of Iron*.¹

“Take of iron, sulphuric acid, each eight ounces; water, four pints. Mix the sulphuric acid with the water in a glass vessel, and to these add the iron; then, when the effervescence is over, filter the solution through paper, and evaporate it over the fire, so that crystals may form as it cools. Pour off the water, and dry the crystals upon bibulous paper.”

SULPHAS FERRI. Edin. *Sulphate of Iron*.

“Take of purified filings of iron, six ounces; sulphuric acid, eight ounces; water, two pounds and a half. Mix, and when the effervescence is over, digest the mixture for some time upon hot sand; then filter the solution through paper, and after due evaporation set it apart, that crystals may form.”

¹ Old names of this salt:—*misy, sorry, calchantum*; (Pliny) *sal martis, sal chalybis vitriolum ferri, vitriolum martis*. Syn. Sulfate de Fer (F.) Schwefelsäures Eisen (G.) Solfato di Ferro (I.) Una Baydie (Tam.) Casis (Hind.)

SULPHAS FERRI. Dub. *Sulphate of Iron.*

“Take of iron wire, *two ounces*; sulphuric acid, *three ounces and a half*; water, *one pint*. Mix gradually the acid with the water; then add the wire cut into pieces, and digest the mixture that the metal be dissolved, after which filter the solution through paper; finally, after due evaporation, set it apart, that crystals may form by slow cooling.”

In these processes part of the water is decomposed, the iron is oxidized by combining with its oxygen, while its hydrogen is dissipated in the gaseous form; and the oxide thus produced unites with the acid and forms sulphate of iron, or rather sulphate of oxide of iron; which is dissolved in the undecomposed portion of the water. Concentrated sulphuric acid, nevertheless, scarcely exerts any action on iron at a low temperature, and water alone is very slowly decomposed by it, so that the rapid decomposition of the diluted acid by the iron must be ascribed to the sum of the affinities of the base of the acid for oxygen, and of the iron for oxygen being superior to that of the oxygen to the hydrogen of the water, which is therefore decomposed. The solution is of a pale green colour, and when evaporated directly, yields crystals of sulphate of iron¹; but if it be exposed for some time to the atmosphere it attracts oxygen, becomes turbid, a subsulphate is precipitated, and the salt obtained is an oxysulphate.

Qualities. — Sulphate of iron has a strong styptic taste: it crystallizes in transparent rhomboidal prisms, of a fine green colour, which redden the vegetable blues; are soluble in two parts of water at 60° and $\frac{1}{3}$ ths of their weight of boiling water, and are insoluble in alcohol. When exposed to the air, the crystals become opaque, and are covered with a yellow powder, owing to the attraction of the oxygen of the atmosphere by the salt, during its efflorescence. Exposed to heat sulphate of iron undergoes the watery fusion; and in an increased heat the acid is driven off, and the base remains in the state of a red oxide, the colcothar of vitriol of commerce. According to Dr. Thomson², 100 parts of the green sulphate consist of 26.7 of sulphuric acid, 28.3 oxide of iron, and 45.0 of water.³ The following substances decompose sulphate of iron: the earths, the alkalies and their carbonates; borate of

¹ This salt, which is known in commerce by the name of *green vitriol*, is prepared on the great scale from native sulphurets of iron, by exposing them to the air and moistening them, till a crust of sulphate of iron is formed on their surface, which is afterwards obtained in crystals by solution and evaporation.

² *System of Chemistry*, 4th ed. iii. 225.

³ Of this quantity of water, 8 parts are water of composition, the oxide being in the state of a hydrate.

soda, phosphate of soda, muriate of barytes, nitrate of silver, acetate and superacetate of lead, and almost every salt, the base of which forms an insoluble compound with sulphuric acid: hence these are incompatible in formulæ with this salt.

Medical properties and uses. — Sulphate of iron is tonic, emmenagogue, and anthelmintic.¹ It is a useful remedy when exhibited with due caution, in all cases in which preparations of iron are indicated; but in improper doses it occasions pain of the bowels, nausea, and vomiting, and often proves hurtful by being too long continued. It has been given with advantage in diabetes, in the latter stage of phthisis, and in amenorrhœa, depending on a weakened action of the blood-vessels. The dose is from gr. j. to v. combined with ammoniacum, rhubarb, myrrh, or bitter extracts. It has lately been used dissolved in water as a lotion to cancerous and phagedenic ulcers.²

Official preparation. *Tinctura Ferri Muriatis*. D.

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

“Take of sulphate of iron, *any quantity*. Let it be heated in an unglazed earthen vessel, on a moderate fire, 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.”

In these processes the degree of heat should not exceed 212° of Fahrenheit. The salt is merely deprived of its water of crystallization, without undergoing any chemical change.

Official preparation. *Oxydum Ferri rubrum*. E. D.

OXIDUM FERRI RUBRUM. Edin.³ *Red Oxide of Iron.*

“Let dried sulphate of iron be exposed to a violent heat, until it is converted into a red-coloured substance.”

OXYDUM FERRI RUBRUM. Dub. *Red Oxide of Iron.*

“Let dried sulphate of iron be roasted in a strong fire until it is converted into a red substance; then let this be washed till the water poured from it does not indicate, by the test of litmus, the presence of any acid; and lastly, dry it upon bibulous paper.”

¹ It was used as an anthelmintic in the time of Pliny, who says, “Sumitur ad depellenda ventris animalia drachmæ pondere cum melle.” *Nat. Hist.* lib. xxxiv. cap. 12.

² *Edinburgh Med. and Surg. Journal*, ii. 373.

³ Oxide de fer rouge (F.) Eisenoxyd (G.) Perossido rosso di Ferro (I.)

By the degree of heat employed, the sulphuric acid of the sulphate is partly driven off in a highly concentrated state, and partly decomposed, sulphurous acid being disengaged, and the oxide, which is the base of the sulphate, becomes more highly oxidized.

The residue is the red oxide of iron, combined with a portion of the red sulphate, which renders it deliquescent; and which should therefore be separated by washing, as directed by the Dublin College.

According to Proust, the red oxide at the highest degree of oxidizement consists of 48 parts of oxygen and 52 of iron.

Medical properties and uses.—This preparation is possessed of the same medicinal properties as the other preparations: but it is very rarely used, except as a pharmaceutical agent.

Official preparation. *Murias Ammoniacæ et Ferri.* E. D.

FERRUM TARTARIZATUM. Lond. *Tartarized Iron.*

“Take of iron, a pound; supertartrate of potash, in powder, two pounds; water, a pint. Rub them together, and expose the mixture in an open glass vessel to the action of the air for eight days; then dry it in a sand-bath, and reduce it to a very fine powder. To this powder add a pint of water, and put it aside for eight days; then dry it, and reduce it to powder.”

TARTRAS POTASSÆ ET FERRI. Edin.¹ *Tartrate of Potash and Iron.*

“Take of purified filings of iron, one part; supertartrate of potash powdered, two parts; water, one part. Rub them together and expose them to the air in a shallow earthen vessel for fifteen days, stirring the mass daily with a spatula, and keeping it moist by frequent additions of water. Then boil the whole for a short time in four times its weight of water, and pour off the solution from the other fæces. Evaporate the solution to dryness in a water bath, and having rubbed the mass into powder, preserve it in a well-stopped bottle.”

TARTARUM FERRI.² Dub. *Tartar of Iron.*

“Take of carbonate of iron, half an ounce; crystals of tartar in very fine powder, an ounce; distilled water, a pint. Let them be put into a glass vessel, then boiled for an hour over a slow fire, and the liquor filtered through paper; when this is cold, filter it again, and evaporate it until a pellicle appears on the surface: the liquor, as it cools, will concrete

¹ Tartrate de Fer et de Potasse (F.) Eissen Weinstein (I.) Tartrato di Potassa e di Ossido di Ferro (G.)

² It is remarkable that both the London and Dublin Colleges should err in giving a name to this triple salt so dissonant to the principles of the reformed nomenclature of their pharmacopœias.

into a saline mass, which is to be reduced to powder, and preserved in closely stopped phials."

Of these three processes, those of the Edinburgh and the Dublin Colleges are to be preferred, as they afford a perfect triple salt; whereas much of the iron employed in the London process remains unaltered, or is at least only in the form of a simple oxide. In the London process, the iron is first oxidized by the partial decomposition of the water, aided by the action of the air, and the oxide thus formed unites with the superabundant acid of the supertartrate of potash: hence the dried mass consists of tartrate of potash and iron, mixed with oxide of iron, and some metallic iron. The subsequent addition of water, and re-exposure to the air, are intended to render the oxidizement complete, and convert the whole to the state of the triple salt; but as this is not effected, it is probable that the proportion of supertartrate of potash ordered, is insufficient for the large quantity of the metal directed to be used. In the Edinburgh and Dublin processes, the superabundant acid of the supertartrate of potash dissolves as much of the oxide of the carbonate of iron as it can take up; and a clear solution is obtained, which, by evaporation, yields a true tartrate of potash and iron. As it is almost impossible to procure this salt in crystals, the solution may be evaporated to dryness.

Qualities.—Tartrate of potash and iron is inodorous, has a slightly styptic taste, and is of a brownish green colour. It is very soluble in water, and deliquesces, in some degree, when exposed to the air, so as to require to be kept in closely stopped phials. The cold solution of the alkalies and their subcarbonates do not decompose this salt; but it is instantly decomposed when boiled with any of them except ammonia and its subcarbonate, which in neither state affect it. The hydrosulphuret of potash and infusions of astringent vegetables decompose it, and are therefore incompatible in formulæ with it.

Medical properties and uses.—This salt possesses the same medicinal powers as the other preparations of iron; but from its mildness, slight taste, and ready solubility, it is a more convenient form for the administration of this metal to children, and in many cases in which the other saline preparations of it prove nauseating, and sit uneasy on the stomach. It is advantageously given in all the cases in which chalybeates prove useful: and is also extolled as a remedy in dropsy, in which it is supposed to exert both a diuretic and a tonic power. The dose is from grs. x. to ʒss, given either in a state of solution, or in the form of powder or bolus, combined with an aromatic, or bitter.

LIQUOR FERRI ALKALINI. Lond.² *Solution of Alkaline Iron.³*

“Take of iron, *two drachms and an half*; nitric acid, *two fluid ounces*; distilled water, *six fluid ounces*; solution of subcarbonate of potash, *six fluid ounces*. Mix together the acid and the water, pour the mixture over the iron, and when the effervescence has ceased pour off the acid solution. Add this gradually, and at intervals, to the solution of subcarbonate of potash, frequently agitating until it become of a brownish red colour, and no more effervescence is excited. Finally, set it aside for six hours, and pour off the liquor.”

Although this composition has been long known, yet it is not well understood. The diluted acid¹ acts violently upon the iron and oxidizes it, while heat is evolved, and red fumes are extricated, consisting of nitrous gas and nitrous oxide. If this action be moderated by the iron being in a lump, and putting the vessel in which it is dissolving into cold water, the solution is of a pale green colour, and the iron is at the minimum of oxidizement; but if heat be applied, or the effervescence be allowed to proceed with violence, the solution is of a reddish brown colour, and contains oxynitrate of iron; a great excess of acid being present in both cases. On each addition of the solution of the subcarbonate of potash to either of these solutions, effervescence is excited by the disengagement of carbonic acid, and a red precipitate is instantly produced, which is however kept suspended by agitation, and ultimately redissolved by the excess of alkali. By allowing the mixture to stand for six hours as directed, particularly if the weather be cold, the whole becomes involved in a spongy mass of acicular crystals of nitrate of potash, from which the alkaline metallic solution is to be poured off: it is clear, and of a deep brownish red colour, if the acid solution contain the metal at the minimum of oxidizement: but if at the maximum, it is turbid and of a redder hue. The first of these is the preparation of the London College.

Qualities.—This preparation has an alkaline, slightly styptic taste, and excites the sensation of coldness in the mouth produced by nitrate of potash, but in an inferior degree. The metallic part is precipitated by water⁴; and the clear superna-

¹ Teinture martiale alkaline de Stahl (*F.*) Tintura di marte alkalina de Stahl (*I.*)

² This name has been justly criticised, as implying an unknown substance, “alkaline iron;” it should have been, *Liquor alkalinus ferri oxidi*.

³ The concentrated acid scarcely acts on iron.

⁴ This precipitate, when the iron has been rapidly dissolved in the acid and heat employed, is a combination of peroxide of iron and carbonic acid. It effervesces strongly with muriatic acid, and gives off carbonic acid during the solution.

tant fluid, when evaporated, yields crystals of nitrate of potash, proving that the solution contains this salt mixed with the alkaline oxide of iron, if not a nitrate of potash and iron. On the addition of alcohol to this solution the whole of the solid ingredients are thrown down in a concreted mass; it is also decomposed by the strong acids, and the pure alkalis; and after being kept for some time, if not very well excluded from the air, it becomes gradually turbid, perhaps owing to the abstraction of oxygen from the atmosphere more completely oxidizing the metal, and much of the oxide is deposited.

Medical properties and uses.—This solution very probably agrees with the other preparations of iron in its medicinal properties; but, setting aside the difficulty of procuring it always of an uniform strength, and the many circumstances in conducting the process, that may alter altogether the nature of the product, we do not know in what mode it can be given; as water, and consequently all infusions and decoctions decompose it, and precipitate the metal. It is therefore difficult to conceive for what purpose it has been introduced into the London Pharmacopœia.

TINCTURA FERRI AMMONIATI. Lond. *Tincture of ammoniated iron.*

“Take of ammoniated iron, *four ounces*; proof spirit, *a pint*. Digest and filter.” This being merely a spirituous solution of ammoniated iron, it seems to be unnecessarily introduced into the pharmacopœia by the London College.

TINCTURA FERRI MURIATIS.¹ Lond. *Tincture of Muriate of Iron.*

“Take of carbonate of iron, *half a pound*; muriatic acid, *a pint*; rectified spirit, *three pints*. Pour the acid over the carbonate of iron, in a glass vessel, and shake them occasionally for three days. Set apart the liquor, that the fæces, if there be any, may subside; then pour off the solution, and add the spirit to it.”

Edinburgh.

“Take of black oxide of iron, purified and reduced to powder, *three ounces*; muriatic acid, about *ten ounces*, or as much as may be sufficient to dissolve the powder. Digest with a gentle heat, and the powder being dissolved, add as much alcohol as will make the whole liquor amount to two pounds and a half.”

Dublin.

“Take of rust of iron, *half a pound*; muriatic acid, *three pounds*; rectified spirits of wine, *three pints*. Put the rust

¹ Koch salzaure Eissentinktur (G.) Tinctura di muriato di Ferro (I.)

into a glass vessel, pour on the acid, and agitate it occasionally; then set it aside that the fæces may subside, and pour off the liquor: evaporate this slowly, to *one pint*, and when it is cold, add the spirit."

TINCTURA MURIATIS FERRI CUM OXIDO RUBRO. Dub. *Tincture of Muriate of Iron, with the Red Oxide.*

"Take of red oxide of iron, *an ounce*; muriatic acid, *four fluid ounces*; rectified spirit of wine, *a sufficient quantity*. Digest the oxide with the acid for twenty-four hours; then boil the solution for half an hour; evaporate the filtered solution to the thickness of honey, and when it is cold, add rectified spirits of wine, with frequent agitation, until the specific gravity of the tincture be, to that of distilled water, as 1050 to 1000."

Of the formulæ given for the preparation of this tincture, those of the London and the Dublin pharmacopœias are to be preferred. The metal, as ordered in them, is in a higher state of oxidizement, and forms at once, by its combination with the acid, an uniform compound soluble in alcohol; whereas, by following the Edinburgh process, the solution is a mixture of the above muriate, and of the less soluble or green muriate^r, the black oxide not being all completely oxidized; and it is not till after the exposure to air, and by attracting oxygen, that it is converted altogether into the more soluble muriate. Hence the Edinburgh preparation cannot be always of an uniform and fixed strength, which, for an active medicine, is a matter of much importance. The introduction of the last preparation by the Dublin College is superfluous.

Qualities. — The alcoholic solution of muriate of iron is of a brownish yellow colour, has a peculiar odour and a very styptic taste. It contains the iron in a state of oxymuriate; and when it is distilled, this acid comes over, and leaves a black oxide of iron in the retort. With the alkalies and their carbonates it gives a red precipitate; strikes a black colour with infusions of astringent vegetables; and forms with mucilage of acacia gum, an orange-coloured jelly. Hence these substances cannot enter into compositions with this tincture.

Medical properties and uses. — This is an active and elegant preparation of iron, well adapted for all the diseases in which chalybeates prove serviceable. It is also recommended in dysury depending on spasmodic stricture of the urethra, in which case it is given in doses of five or six drops, repeated every ten or fifteen minutes, until nausea be induced. It is also used externally, as a styptic in cancerous and loose fun-

^r When iron filings are dissolved in muriatic acid, and completely excluded from the air, a muriate is formed insoluble in spirit of wine. *Davy's Researches*, p. 180.

gous sores. The usual dose is from ℥ x. to ℥ xxx. in a glass of water: but it may be gradually increased to ℥ cxx.

ACETAS FERRI. Dub. *Acetate of Iron.*

“Take of carbonate of iron, *half an ounce*; acetic acid, *three fluid ounces*. Digest for three days, and filter.”

This preparation is a mild and efficacious chalybeate; but if the variety of forms in which iron is ordered to be prepared for medicinal purposes be considered, it will obviously appear to be superfluous.

TINCTURA ACETATIS FERRI.¹ 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 together the acetate of kali and the sulphate of iron, in a stone-ware mortar, until they unite into a soft mass; dry this with a moderate heat, and triturate it with the spirit; then put the mixture into a phial; cork it closely, and digest for *seven days*, frequently shaking it: finally, pour the clear tincture from off the *feces*.”

TINCTURA ACETATIS FERRI CUM ALCOHOLE. Dub. *Tincture of Acetate of Iron with Alcohol.*

“Take of sulphate of iron, acetate of kali, each *an ounce*; alcohol, *two pints*. Rub together the acetate of kali and the sulphate of iron in a stone-ware mortar, until they unite into a soft mass; then dry this with a moderate heat, and when it is cold, triturate it with the alcohol. Put the mixture into a phial, cork it closely, and digest for *twenty-four hours*, frequently shaking it; finally, pour the clear tincture from off the *feces*.”

These two preparations differ in scarcely any thing except strength; the theory of the formation of the acetate of iron being the same in both cases. During the process a double decomposition takes place; the sulphuric acid of the sulphate of iron leaves the iron and unites with the potash of the acetate of potash, while the disengaged acetic acid of the latter salt combines with the iron, forming acetate of iron, which is soluble in the alcohol. It is also probable that the oxide of iron absorbs oxygen during the trituration, and being thus more completely oxidized, the mass must contain, instead of an acetate, an oxyacetate of iron, which is more readily dissolved in the alcohol. The sulphate of potash remains undissolved in both processes, with a small portion of uncombined oxide of iron, in the form of a brownish precipitate.

Qualities.—These tinctures have a peculiar odour, a warm

¹ Acetate de Fer (F.) Acetato di Ferro (I.)

² Teinture de l'acetate de Fer (F.) Tinturo di marte astringente (I.)

styptic taste, and a reddish-brown colour. They are decomposed by the alkalies and their carbonates, and the strong acids, and by infusions of astringent vegetables, which are therefore incompatible in formulæ with them.

Medical properties and uses.—These spirituous solutions of acetate of iron possess the same properties as the other preparations of this metal; but if the introduction of the simple acetate be superfluous, the double form of its spirituous solution is still more objectionable. Indeed, every advantage that can be expected from any of these forms of the acetate can be equally obtained from the tartrate of iron and potash (*ferrum tartarizatum*). And we cannot conceive that any particular benefit can result to practice from loading the list of remedies with all the multifarious states of combination of which the same substance is susceptible. The dose of either of these tinctures may be from m x. to fʒj. given in a sufficient quantity of water, or any other proper vehicle.

VINUM FERRI. Lond. *Wine of Iron.*¹

“Take of filings of iron, *two ounces*; wine, *two pints*. Mix them, and set the mixture aside for a month, occasionally shaking it; then filter it through paper.”

Dublin.

“Take of iron wire cut in pieces, *four ounces*; white Rhenish wine, *four pints*. Sprinkle a little of the wine over the iron filings, and expose them to the air, until they be covered with rust, then add the remainder of the wine; digest for seven days, frequently agitating; and, lastly, filter.”

As the iron is oxidized and dissolved in the wine by the tartaric acid of the supertartrate of potash it contains, the Rhenish wine ordered by the Dublin Pharmacopœia will be found to answer better for this preparation than the sherry directed by the London College. It is therefore a vinous solution of tartrate of iron and potash; and when prepared in the mode ordered by the London College, each pint contains about grs. xxj. of oxide of iron. The strength, however, must altogether depend upon the state of the wine: and it is to be regretted that the College did not follow the same plan it adopted for the solution of ammoniated copper, and employ a given portion of *ferrum tartarizatum*, which readily dissolves in wine, and forms a permanent solution.

Medical properties and uses.—This is the least unpleasant of the preparations of iron. It is chiefly employed in chlorosis, and the relaxed habits of young females. The dose is from fʒj. to fʒvj. given twice or three times a day.

¹ Vinum chalybeatum, P. L. 1745. Eissenwein (G.)

PRÆPARATA EX HYDRARGYRO.

PREPARATIONS OF MERCURY.

HYDRARGYRI NITRICO-OXYDUM. Lond. *Nitric Oxide of Mercury.*¹

"Take of purified mercury, *three pounds*; nitric acid (by weight) *a pound and a half*; distilled water, *two pints*. Mix them in a glass vessel, and boil until the mercury be dissolved, and a white mass remains after the evaporation of the water. Rub this into powder, and put it into another vessel very shallow; then expose it to a gentle heat, and gradually raise the fire until it cease to emit red vapours.

OXYDUM HYDRARGYRI RUBRUM PER ACIDUM NITRICUM. Edin. *Red Oxide of Mercury by nitric Acid.*

"Take of purified mercury, *three parts*; diluted nitrous acid, *four parts*. Dissolve the mercury, and evaporate the solution over a gentle fire to a white dry mass, which being rubbed to a powder, is to be put into a glass cucurbite, and covered with a thick plate of glass. Then adapt a capital to the vessel, and having placed it in a sand-bath, let the contained matter be roasted with a fire gradually raised until it pass into small very red scales."

OXYDUM HYDRARGYRI NITRICUM. Dub. *Nitric Oxide of Mercury.*

"Take of purified mercury, *ten ounces*; diluted nitrous acid, *ten fluid ounces*. Let them be mixed in a glass, and the mercury dissolved with a gradually raised heat; then increase the fire until the residuary matter in the bottom of the vessel be converted into red scales."

In this process the mercury is first oxidized at the expense of part of the acid employed, and the oxide, which is in a high state of oxidizement, combines with the undecomposed acid, so as to form a nitrate of mercury. By augmenting the heat, this nitrate is decomposed, the acid and water are nearly altogether expelled, and the oxide is left of a bright red colour, or rather the subnitrate, for it is combined with a small portion of acid. However simple the process may appear to be, yet it has been always found difficult to produce the bright red scaly

¹ Hydrargyrus nitratus ruber, P. L. 1787. Oxide mercure rouge par l'acide nitrique (F.) Rother præcipitat. (G.) Mercurio Precipitato Rosso (I.)

appearance, which the product should have when it is properly prepared. Much of the success of the process appears to depend on the purity of the acid; the proper regulation of the heat, which, at the utmost, should not be 600° ; and the scale on which it is formed, the heat being more steadily maintained, and acting with more uniformity, on a large than on a small quantity of materials. Hence the red precipitate prepared in Holland, where it is manufactured largely, has always been considered better than any prepared in this country. The proportions used by the Dutch chemists are 50 pounds of pure mercury, and 70 of pure nitrous acid of a specific gravity 1.3. The decomposition is conducted in very large flat vessels, the fire being raised when the gaseous nitrous acid ceases to be sensibly disengaged; and the test of its perfection is the inflammation of a match which has been just blown out, by introducing it into the vapour arising from the decomposing oxide.¹

Qualities.—When properly prepared, this subnitrate of mercury is in small scales of a bright red colour, very acrid and corrosive; insoluble in water, but totally soluble in nitric acid without effervescence. It is completely volatilized in a red heat, and at the same time decomposed. We have found the observation of Dr. Murray correct, that “if the preparation be boiled for a short time with five or six times its weight of water, the liquor, when filtered, has the styptic metallic taste, and gives a white precipitate with water of ammonia or carbonate of potash; a plain proof that it holds dissolved nitrate of mercury.”² According to Payssé, 100 parts contain 82 of mercury, and 18 of oxygen. It is sometimes adulterated with red oxide of lead, which may be detected by dissolving one part of the oxide in four of acetic acid; if lead be present, the solution has a sweetish taste; and when sulphureted water is dropped into it, a dirty dark precipitate is thrown down.

Medical properties and uses.—Nitric oxide of mercury is stimulant and escharotic. It is an external application only, being used, when rubbed into a fine powder, as a stimulant to old sores, and for destroying fungus. As a powder, in the proportion of gr. i. s to gr. iv. of sugar, it is blown into the eye to remove specks on the cornea; and formed into an ointment with lard, it is an useful application to ulcerations of the eyelids, and to chancres.

Official preparation. *Unguentum Hydrargyri Nitrico-oxidi.*
L. E. D.

¹ Higgins, *Essays*, i. 133.

M. Payssé, *Annales de Chimie*, li. 202.

System of Materia Medica, ii. 329. Dr. Murray suggests, that it should have been named *Subnitrates Hydrargyri ruber*.

ACETAS HYDRARGYRI. Edin.¹ *Acetate of Mercury.*

"Take of purified mercury, *three ounces*; diluted nitrous acid, *four ounces and a half*, or a little more than may be required for dissolving the mercury; acetate of potash, *three ounces*; boiling water, *eight pounds*. Mix the mercury with the acid; and, towards the cessation of the effervescence, digest, if necessary, until the mercury be completely dissolved. Then dissolve the acetate of potash in the boiling water; and immediately to this solution, still hot, add the former, and mix them together by agitation. Set the mixture aside to crystallize; then wash the crystals placed in a funnel with cold distilled water; and finally dry them with a very gentle heat.

"In preparing acetate of mercury, it is necessary that all the vessels, and the funnel, which are used, be of glass."

ACETAS HYDRARGYRI. Dub. *Acetate of Mercury.*

"Take of purified mercury, *three ounces*; diluted nitrous acid, *three fluid ounces*; acetate of kali, *three ounces*; boiling distilled water, *eight pints*. Add the acid to the mercury, and when the effervescence is over, digest upon hot sand, that the metal may be dissolved; mix this solution immediately with the boiling water in which the acetate of kali has been previously dissolved, and then let the mixture be passed as quickly as possible through a double linen cloth. Cool it, that crystals may form; wash these with cold distilled water, and dry them upon paper with a very gentle heat.

"In the whole of this process glass vessels must be used."

Acetic acid scarcely acts on mercury, but by either of the above processes the acetate may be formed. Nitrate of mercury is first obtained by the action of the nitric acid on the mercury; and this is decomposed by the acetate of potash, the alkali of which unites with the acid of the metallic salt, and forms nitrate of potash, which remains in solution; while the disengaged acetic acid combines with the oxide of mercury, and forms the acetate of mercury, which readily crystallizes, and is thus easily separated. By preparing the solution of the nitrate of mercury with a gentle heat, when there is an excess of acid, the portion of mild acetate of mercury produced is considerable; but if the quantity of acid be sufficient for the saturation only of the oxide, a sudden decomposition of the solution is effected by the hot water which contains the acetate of potash in solution, independent of the action of the acetate, and a subnitrate of mercury of a yellow colour is precipitated. Hence the propriety of the direction of the Edinburgh College to use more acid "than is required for dissolving the mercury." It is of much importance also that the degree of heat be low;

¹ Acetate de Mercure (F.) Essigsäure Quecksilber (G.) Acetato di Mercurio (I.)

for if a high temperature be employed, the metal is oxidized to a maximum, and the product of the subsequent part of the process is an oxyacetate, which is very acrid and soluble, instead of the salt intended to be produced. For the success of the process, which often fails, the solution of the acetate of potash should not be used immediately after it is made, but should be scarcely more than tepid when it is mixed with the solution of nitrate of mercury; and to the water employed for washing the salt, should be added about $\text{f}\text{ʒj}$. of distilled vinegar for every Oss of water; which prevents the partial decomposition of the acetate, and the consequent yellow colour of the crystals, that sometimes occur in the washing.

Qualities.—This salt, when properly prepared, is in small flat crystals, of a silvery whiteness, acrid to the taste, soluble in hot water, but scarcely soluble in cold water; and having an acrid taste. It is insoluble in alcohol. The alkalies decompose it, and it is readily decomposed by heat. Light also has this effect, blackening the salt. The proportion of its constituents has not yet been ascertained.

Medical properties and uses.—Acetate of mercury is antisyphilitic and alterative; but it is scarcely ever used, unless as the active ingredient of Keyser's pills. As an external application, a solution of it, in the proportion of grs. ij . in $\text{f}\text{ʒij}$. of rose water, is used in some cutaneous affections. The internal dose is gr. j , night and morning.

HYDRARGYRI OXYDUM CINEREUM. Lond.

Grey Oxide of Mercury.

“Take of submuriate of mercury, *an ounce*; lime-water, *a gallon*. Boil the submuriate of mercury in the lime-water, stirring it assiduously, until the grey oxide of mercury subside. Wash this with distilled water, and then dry it.”

OXYDUM HYDRARGYRI CINEREUM. Edin. *Grey Oxide of Mercury.*

“Take of submuriate of mercury, *half an ounce*; lime-water *five pounds*. Boil the submuriate in the solution, for a quarter of an hour in a slightly covered vessel. Pour off the supernatant fluid, then wash the oxide with distilled water; and dry it.”

PULVIS HYDRARGYRI CINEREUS. Dub. *Grey Powder of Mercury.*

“Take of mercury, *two ounces*; diluted nitrous acid, *two fluid ounces*; dissolve the mercury in a slow heat, and dilute the solution with *eight fluid ounces* of cold water; then drop into it *one ounce* and a *half* of the water of carbonate of ammonia, or as much as may be sufficient for precipitating the

¹ Oxide gris de Mercure (F.) Schwarzes gesauertes Quecksilber (G.) Protossido cinereo di Mercurio (I.)

whole of the metal, which is to be washed with boiling distilled water, until the poured off fluid yield no sediment when water of sulphuret of ammonia is dropped into it. Finally, let the precipitate be dried."

The appellations given to these preparations would lead to the supposition that they were essentially the same, although the Dublin process differs from the other two; and scarcely any difference, indeed, exists between the products of the three processes, when they are properly conducted. In the London and Edinburgh processes, the lime-water decomposes the mercurial salt, its lime unites with the acid of the mild muriate, and the insoluble oxide, which is at a low state of oxidization, remains of a greyish colour, while the muriate of lime which is formed, being soluble, is easily separated by washing. In the Dublin process it is intended, first, to produce a nitrate of mercury with the metal, at a low state of oxidization; so that by the addition of the carbonate of ammonia a decomposition may be effected, and grey oxide of mercury, and muriate of ammonia formed, which are to be separated by the subsequent washings. But if the nitrate of mercury be formed, with the assistance of heat, as ordered by the Dublin College; or even if the solution be quickly made without heat, the metal becomes too highly oxidized, and the result is not the grey oxide, which the College intends should be produced, but is a mixture of the grey oxide, and a triple compound of oxide, mercury, ammonia, and nitric acid.¹ The directions of this formula are not sufficiently distinct to produce the effect intended; and, therefore, the following directions given by Hahneman for this preparation are absolutely necessary to be followed for obtaining the grey oxide in a purer form. Dilute the acid with two parts of water, and add the mercury in small quantities at a time, placing the vessel in cold water to moderate the rise of temperature during the solution, which thus proceeds very slowly. When the acid has taken up as much of the metal as will saturate it, dilute the solution with twenty parts of distilled water, and drop in solution of ammonia as long as any precipitate is produced. Wash the precipitate immediately in water, and dry it on bibulous paper before the fire.² The same effect is produced if subcarbonates of ammonia be used, the carbonic acid being disengaged.

Qualities.—Grey oxide of mercury, properly prepared, is in the form of an impalpable blackish grey-coloured powder, which becomes paler if exposed to air and light. It is inodorous, insipid, and insoluble in water. In the state in which it is usually found in the shops, it is of a light grey colour, almost

¹ *Green's Chemistry*, (translation.) ii. 230.

² *Murray's Chemistry*, 2d edit. iii. 178.

approaching to a white, in which state it contains the triple salt above mentioned. When prepared according to the London formula, it has been supposed¹, that the lime not being able to abstract the whole of the acid, the product is strictly a submuriate of mercury. We find, from experiment, that this is actually the case, and it is not improbable that a minute portion of the lime may also be precipitated in the state of carbonate. The constituents of the grey oxide are supposed to be 96 parts of mercury, and 4 of oxygen, in 100 parts.²

Medical properties and uses.—The grey oxide of mercury, when well prepared, may be used as a substitute for the oxide prepared by trituration; and as it is more likely to be always of an uniform strength, it may of course be more depended on than that preparation. It has been, however, objected to for forming ointment for the purposes of mercurial frictions; (see *Ung. Oxydi Hydrargyri cinerei*)—but perhaps the objections have originated from that form of the preparation having been used which contains the triple salt. We have seen it used with advantage for fumigation, both locally applied to assist the healing of venereal ulcers; and, generally, to bring the habit under the influence of mercury, when it could not be introduced by the ordinary mode. The dose of this oxide is from gr. i. to grs. iij. given in the form of pill twice a day.

Official preparation. *Unguentum Oxydi Hydrargyri cinerei*. E.
HYDRARGYRI OXYDUM RUBRUM. Lond.³ *Red Oxide of Mercury.*

“Take of purified mercury, a pound. Put the mercury into a glass vessel with a narrow mouth and broad at the bottom. Expose this vessel open to a heat of 600°, until the mercury be converted into red scales; then rub these to a fine powder.”

OXYDUM HYDRARGYRI. Dub. *Oxide of Mercury.*

“Take of purified mercury, any quantity. Put it into an open glass vessel with a narrow mouth and a broader bottom, and expose it to a heat of about 600°, until it be converted into red scales.”

In this process the mercury is brought nearly to the boiling point⁴, so as to be volatilized, in which state it decomposes atmospherical air attracting its oxygen, and is converted into a red oxide. A small quantity of mercury requires several weeks to be thus oxidized; and therefore as much only is introduced into the vessel as can cover the bottom of it; and

¹ Murray's *System of Materia Medica*, ii. 326.

² Fourcroy.

³ Hydrargyrus calcinatus, P. L. 1787. Oxide de Mercure rouge par le feu (F.)
Rothes Quecksilberoxyd (G.) Perossido rosso di Mercurio (I.)

⁴ Irvine makes the boiling point of mercury to be 672°; Crichton, 655°; and Dalton, 660°.

both on this account, and in order to prevent the dissipation of the volatilized metal, the shape of the vessel is of some importance. It should have a wide bottom and a long neck, the extremity of which is extended almost to a point; and it should be heated in a sand-bath, the sand not rising higher round the vessel than the mercury stands within it. By keeping up a steady heat, a constant circulation of the mercurial vapour is kept up in the upper part of the matrass, and as it combines with oxygen, a dull film first forms on the surface of the mercury, which is next converted into a black powder, and then into red shining scales. A part of the mercury is always lost; and as the process requires much attention, and so long a time for its completion, the preparation is necessarily expensive.

Qualities.—*Red oxide of mercury* is obtained in the form of minute, crystalline, very brilliant, sparkling, deep red scales, inodorous, but acrid and caustic, although less so than the former preparation. It is soluble in several of the acids without decomposition. It is soluble in water also, and the solution changes to green the syrup of violets. When rubbed with running mercury, both are changed into black oxide; and when heated to ignition in a glass retort, it is decomposed; very pure oxygen being obtained, and the metal again returns to the state of running mercury. According to Lavoisier, 100 parts of this oxide contain 7 of oxygen; Fourcroy makes the proportion of oxygen 8; and Chenevix, 15 parts. The light partially decomposes the red oxide, hence it should be kept in opaque bottles.

Medical properties and uses.—This is a very active preparation of mercury, and has been employed by some very celebrated practitioners¹ as an internal remedy in syphilis. It is, however, very apt to vomit, purge, and otherwise violently affect the stomach and bowels; consequently it is now scarcely ever exhibited internally, or employed as an antisyphilitic. The dose may be gr. j. combined with gr. ss. of opium, in the form of pill, night and morning. It is chiefly used as an external stimulant, and escharotic in the same cases as the nitric oxide; being previously rubbed to a fine powder, and either sprinkled over the ulcers; or united with lard, and applied as an ointment.

HYDRARGYRI OXYMURIAS. Lond.² *Oxymuriate of Mercury.*

“Take of purified mercury, *two pounds*; sulphuric acid, *thirty ounces* (by weight); dried muriate of soda, *four pounds*. Boil the mercury with the sulphuric acid in a glass vessel, until the sulphate of mercury becomes dry: rub this, when it is cold,

¹ John Hunter.

² *Syn.* Muriate de Mercure corrosif (F.) Azzendes alsaures Quecksilber (G.) Mercurio sublimato corrosivo (L.)

with the muriate of soda in an earthen-ware mortar; then sublime it in a glass cucurbit with a gradually raised heat."

MURIAS HYDRARGYRI CORROSIVUS. Edin. *Corrosive Muriate of Mercury.*

"Take of purified mercury, *two pounds*; sulphuric acid, *two pounds and a half*; dried muriate of soda, *four pounds*. Boil the mercury with the sulphuric acid in a glass vessel placed in a sand-bath, until the matter becomes dry. Mix this, when it is cold, in a glass vessel, with the muriate of soda; then sublime in a glass cucurbit with a gradually raised heat. Separate the sublimed matter from the scorix."

MURIAS HYDRARGYRI CORROSIVUM. Dub. *Corrosive Muriate of Mercury.*

"Take of purified mercury *two pounds*; sulphuric acid, *three pounds*; dried muriate of soda, *two pounds and a half*. Dissolve the mercury in the acid, and gradually increase the heat until the matter become almost dry; let this, when it is cold, be rubbed with the muriate of soda in an earthen-ware mortar; and then sublime it in a proper vessel with a gradually raised heat."

Sulphuric acid does not act upon mercury at a low temperature; but when three parts of this acid are boiled upon two of mercury, the metal decomposes the acid, and is oxidized, sulphurous gas being emitted with effervescence; and there remains a dry mass of a fine white colour, which is an oxysulphate of mercury combined with an excess of acid. By triturating this salt with dried muriate of soda, and exposing the mixture to heat, a double decomposition is effected; the muriatic acid leaves the soda, and combines with the oxide of mercury of the oxysulphate, while the sulphuric acid unites with the soda, thus forming muriate of mercury and sulphate of soda, the former of which, being easily volatilized, is separated from the latter by sublimation. This process was first proposed by Kunkel, but no salt has been prepared by a greater variety of methods; and as it is now generally manufactured on the large scale, the proportions of the ingredients ordered by the Colleges are perhaps but seldom adopted. Of the three formulæ of the British Colleges, however, that of the Dublin College is to be preferred, as by the larger proportion of sulphuric acid, and the smaller of muriate of soda, a more complete decomposition of the muriate of soda is effected; and consequently a greater quantity of muriatic acid being evolved, a larger proportion of the oxide of mercury must necessarily be converted into muriate. Sixteen ounces of mercury should yield about 3xx. of corrosive muriate. The most simple pro-

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cess, and perhaps the best, is the direct solution of the red oxide of mercury in muriatic acid, by which the salt is obtained by spontaneous crystallization¹; but it is too expensive for general purposes.

Qualities.—Corrosive muriate of mercury² is obtained by the above processes in the form of a white, shining, semi-transparent, easily pulverized mass, made up of small acicular crystals. When the process is very carefully and slowly conducted, the crystals are separate, regular, tetrahedrous, compressed and pointed. On exposure to the air the mass effloresces on the surface. Its specific gravity is 5.1398. It is inodorous, and has a very acrid, disagreeable metallic taste; changes to green several of the vegetable colours; is soluble in 11 parts of water at 60°, two parts at 212°, and in 4 parts of alcohol at 60°. It is soluble also in the sulphuric, nitric, and muriatic acids, and may be again obtained unaltered by evaporating the solutions. The fixed alkalies and alkaline earths decompose it, precipitating it from its solution of an orange-yellow colour, which becomes brick-red. It is also partially decomposed by exposure to light, and by some metals; and changed into calomel.³ The carbonates of the fixed alkalies precipitate it of a fixed yellow hue, and ammonia forms with it a white triple insoluble compound, containing muriate of ammonia and oxide of mercury. When triturated with olive oil, the oil is whitened; and when boiled with it, a small portion of calomel is thrown down; and the same is the case when it is boiled with sugar. The volatile oils reduce it. It is also decomposed by solutions of tartrate of potash and antimony; nitrate of silver and superacetate of lead; and forms precipitates in infusions and decoctions of the following vegetable substances; chamomile flowers, horse-radish root, columba root, catechu, cinchona bark, rhubarb root, senna leaves, simaruba bark, oak bark, tea, and in the almond mixture: consequently, it is incompatible in extemporaneous formulæ with these substances. Mr. Chenevix made the first correct analysis of this salt: according to him, 100 grains of it consist of 18 parts of muriatic acid, and 82 of an oxide of mercury composed of 12.3 of oxygen and 69.7 of mercury⁴; but a more

¹ *Annales de Chimie*, xxviii. 12.

² This appellation, which is that of the Edinburgh and Dublin Colleges, is certainly preferable to that of the London College. But as the name *oxymuriate* is improper in a strictly chemical sense, perhaps the name *deuto muriate of mercury*, which most justly designates its chemical character, would be less exceptionable than any other. The old names were, *Hydrargyri muriatus*, *Mercurius sublimatus corrosivus*.

³ Mr. Chenevix found, "that if a bit of copper be put into a solution of corrosive sublimate, a white powder shortly falls to the bottom, and that powder is calomel. When washed, it does not contain an atom of copper, nor of corrosive sublimate."

⁴ *Phil. Trans.* 1802, part i. 157.

recent analysis of Zaboada makes the proportions 19.5 of acid, and 80.5 of oxide consisting of 8.5 of oxygen and 71.5 of mercury.¹ It should be preserved in opaque bottles.

Medical properties and uses.—This salt has been long known to chemists.² It is a powerful stimulant and alterative; and in large doses is one of the most violent of the metallic poisons. As an antisyphilitic it was early much extolled, and is the active ingredient of many a celebrated empirical nostrum; but modern practice has fixed its real merits much lower than they were formerly placed. When taken in over-doses, either by mistake, or designedly as a poison, the best antidote is white of egg diluted with water, and given in large frequently repeated doses. The albumen decomposes the corrosive muriate, reducing it to the state of the mild muriate, while the compound which it forms with it exerts no deleterious effect on the stomach.³ The presence of corrosive sublimate in any solution suspected to contain it may be detected by putting into the fluid a small piece of clean polished copper, which, if the poison be present, will be covered with a white coating, or white streaks that acquire a metallic lustre when rubbed. It sometimes succeeds in curing the primary symptoms of syphilis, but as often fails; and although it checks the progress of the secondary symptoms, relieving venereal pains, and healing ulcers of the throat, "yet even in these cases," says Mr. Pearson, "it never confers permanent benefit; for new symptoms will appear during the use of it; and on many occasions, it will fail of affording the least advantage to the patient from first to last."⁴ It is given with more advantage in some other affections, as old ulcers, chronic rheumatism, and in cutaneous diseases, particularly lepra, in which Willan says it is the only useful preparation of mercury, "its operation being promoted by giving at the same time an antimonial⁵," and the decoction of the woods. Its sensible operation is by urine; but sometimes it occasions the most violent nausea, griping, and purging, in which cases it should be combined with opium; and it is always necessary to take, during its use, some mucilaginous fluid, to moderate the irritation it is apt to induce. It is also used as an external application. (See the following article.) The dose is from gr. $\frac{1}{4}$ th to gr. $\frac{1}{2}$ th, twice a day, made into a pill with crumb of bread or extract of poppies.

¹ *Journal de Physique*, lx. 383.

² The preparation is said to have been long known to the Chinese, and it is mentioned by Rhazis and Avicenna. Bergman, iv. 281.

³ Orfila. *Traité des Poisons*, t. i. part. i. p. 101.

⁴ Pearson on Remedies for Lues Venerea, &c. 116.

⁵ Willan on Cutaneous Diseases, 140.

Official preparations. *Liquor Hydrargyri Oxymuriatis*. L. *Hydrargyri Submurias*. L. E. D. *Hydrargyri Precipitatus albus*. L. HYDRARGYRI SUBMURIAS.¹ Lond. *Submuriate of Mercury*.

Take of oxymuriate of mercury, *a pound*; purified mercury, *nine ounces*. Rub them together until the globules disappear; then sublime; afterwards take out the sublimed matter, reduce it to powder, and again sublime it twice. Finally, reduce it to a very subtile powder, in the same manner which has been directed for the preparation of chalk."

SUBMURIAS HYDRARGYRI MITIS, sive CALOMELAS. Edin. *Mild Submuriate of Mercury, or Calomel*.

"Take of muriate of mercury, *four parts*; purified mercury, *three parts*. Rub the muriate in a glass mortar with a little water, in order to prevent the acrid powder from rising, then add the mercury, and again triturate until it be extinguished; put the dried mass into an oblong phial, one-third of which only it shall fill, and sublime it in a sand-bath. Again triturate the sublimate powder, and sublime it, then reduce it to a fine powder, which is lastly, to be well washed with boiling distilled water."

SUBMURIAS HYDRARGYRI SUBLIMATUM, sive CALOMELAS. Dub. *Sublimed Submuriate of Mercury, or Calomel*.

"Take of corrosive muriate of mercury, *a pound*; purified mercury, *nine ounces*. Rub them together until the globules disappear, and sublime with a sufficient degree of heat. Let the sublimed matter be rubbed to powder, and again sublimed. Pulverize it, and wash it with frequent affusions of distilled water, until the poured off solution no longer lets any sediment fall on the addition of a few drops of carbonate of kali. Finally, dry it."

This very important preparation is a muriate of mercury, with the metal at a minimum of oxidizement.² By triturating the metallic mercury with the corrosive muriate, it is oxidized at the expence of the oxide of this salt, and the whole mass assumes a grey colour. The sublimations render the combi-

¹ Old names, *Aquila alba*, *Aquila mitigata*, *Manna Metallorum*, *Panchymagogum minerale*, *Panchymagogus quercetanus*, *Sublimatum dulce*, *Mercurius dulcis sublimatus*, *Calomelas*. Syn. Muriate de Mercure doux (F.) Mildes Salzsäures Quecksilber (G.) Mercurio dulce sublimato (L.)

² It is very remarkable that all the Colleges have erred in naming this preparation, which in no point of view can be regarded as a *submuriate*, but is as much a *muriate* as the corrosive sublimate; the sole difference depending on the degree of oxidizement of the metal, which in this preparation is at a minimum. In a medical point of view, we are of opinion that the name *calomel*, however absurd, ought to have been retained, as the syllables *oxy* and *sub* are scarcely sufficient to distinguish the two salts to blundering assistants and apprentices, by whom the most dangerous mistakes may be committed.

nation of the new oxide with the acid complete; but this is not the case in the first sublimation; for both metallic mercury and corrosive muriate are found unchanged in the sublimed mass; and hence the necessity of the second trituration and the subsequent sublimations. By repeating, however, the sublimations too often the product is injured, as corrosive muriate is formed in each sublimation, owing to the attraction of oxygen from the air of the apparatus. The final trituration and levigation are intended to separate any corrosive muriate that may have been formed, and the test of the Dublin Pharmacopœia ought always to be had recourse to for ascertaining this point. In performing the process, the addition of a little water during the trituration of the ingredients, in the first instance, is very necessary; as otherwise, the operator is apt to suffer extremely from the acrid powder of the corrosive muriate which is elevated. Mr. Howard has lately proposed the following improvement in the mode of conducting the sublimation, by which the difficulty which attends the grinding and levigation of the mass sublimed in the usual mode is altogether avoided. Instead of subliming so as to obtain the calomel in a concrete form, the vapour, as it rises, is thrown into a vessel containing water, where it instantly condenses in the form of a fine white impalpable powder. It is not, however, certain that the preparation does not suffer some change of composition, as it is lighter than the levigated calomel in the proportion of 3 to 5. It is undoubtedly more free from any combination of corrosive muriate.

Qualities. — Calomel is obtained by the above processes in the form of a dull semitransparent mass, composed, when the sublimation has been slowly conducted, of short prismatic crystals, the specific gravity of which is 7.1758.¹ It is inodorous, insipid, and has a light yellow or ivory colour, which deepens by long exposure to the light. It is regarded as insoluble, one part requiring 1152 of water at 212° for its solution.² Nitric acid converts it into corrosive muriate, much nitrous gas being evolved; and the same change is effected by oxymuriatic acid. Lime-water and the alkalies, when triturated with it, instantly render it black, a circumstance which supplies us with a test of its purity, for if it contain any corrosive muriate, a yellow tint is mingled with the black on the addition of lime water. According to Chenevix, 100 parts of it contain, 11.5 of muriatic acid, and 88.5 oxide of mercury,

¹ *Annales de Chimie*, xxviii. 12.

² Rouelle.

consisting of 79 of mercury and 9.5 of oxygen¹; but according to Zaboada, the proportions are, 10.6 of acid, and 89.4 of oxide, consisting of 85 of mercury and 4.4 of oxygen.²

Medical properties and uses.— This is the most useful of the preparations of mercury, and is more generally employed than almost any other remedy in the whole range of the *materia medica*. It is antisyphilitic, antispasmodic, alterative, deobstruent, purgative, and errhine. As a remedy in syphilis, it can be fully confided in, when its disposition to run off by the bowels is counteracted by opium; and in the same state of combination it is also found efficacious in several convulsive affections, as epilepsy, trismus, and tetanus: and in that species of spasmodic stricture which occurs in virulent gonorrhœa. As an alterative and deobstruent, it is employed with advantage in cutaneous eruptions, as lepra, and scabies, in which cases it is combined with antimonials and guaiacum; and in hepatitis, and glandular obstructions: in dropsies it assists the action of squill and fox-glove; and as a purgative it may be employed with safety in almost every form of disease not attended with visceral inflammation, or where there is not great irritability and delicacy of habit. Calomel, however, does not act with certainty as a purgative even in large doses, and hence it is generally combined with scammony, jalap, or some other active cathartic. The usual dose to affect the habit and produce ptyalism is from gr. j. to grs. ij. in a pill with opium, given night and morning; and from grs. iij. to grs. viij. act in general as a purgative: but in some complaints, as yellow fever and croup for example, in which it is supposed to exert a specific effect, this dose has been repeated every two or three hours, until upwards of 100 grains have been taken in a very short space of time.

On account of its insolubility and great specific gravity, it can be given only in the form of pills.

¹ Comparative Table of the components of Calomel and Corrosive Sublimate.

CALOMEL.				CORROSIVE SUBLIMATE.			
The oxide of mercury in calomel is composed of				The oxide of mercury in corrosive sublimate is composed of			
Mercury	-	-	89.3	Mercury	-	-	85
Oxygen	-	-	10.7	Oxygen	-	-	15
100.0				100			
And calomel is composed of				And corrosive sublimate is composed			
Mercury 79	{ Oxide of }	{ Mercury }	88.5	Mercury 69.7	{ Oxide of }	{ mercury }	82
Oxygen 9.5				Oxygen 12.3			
Muriatic acid	-	-	11.5	Muriatic acid	-	-	18
100.0				100			

² *Journal de Physique.*

Chenevix, *Phil. Trans.* 1802, 157.

SUBMURIAS HYDRARGYRI PRÆCIPITATUS.

Edin. *Precipitated Submuriate of Mercury.*

“Take of diluted nitrous acid, purified mercury, each *eight ounces*; muriate of soda, *four ounces and a half*; boiling water, *eight pounds*. Mix the mercury with the diluted nitrous acid, and towards the termination of the effervescence digest with a gentle heat, frequently shaking the vessel. It is requisite, however, that more mercury be mixed with the acid than it can dissolve, so that a completely saturated solution be obtained.

“Dissolve at the same time the muriate of soda in the boiling water; then to this add the other solution while it is yet warm, and mix them very quickly together. After the precipitate has subsided, pour off the saline fluid, and wash the submuriate of mercury by frequent affusions of warm water, which are to be poured off each time after the precipitate subsides, until the water comes off tasteless.”

Dub. *Precipitated Submuriate of Mercury.*

“Take of purified mercury, *seven ounces*; diluted nitrous acid, *five fluid ounces*. Pour the acid upon the mercury in a glass vessel, and when the effervescence has ceased, digest with a gentle heat for six hours, with frequent agitation. Then raise the heat, that the solution may boil a little, which is to be poured off from the residual mercury, and quickly mixed with *ten pounds* of boiling water, in which *four ounces* of muriate of soda have been previously dissolved; wash the powder that subsides with warm distilled water, as long as the fluid poured off from it yields a precipitate on the addition of a few drops of the solution of (sub) carbonate of kali; lastly, let it be dried.”

These processes are framed on the process originally suggested by Scheele, and the error into which he was led by reasoning from a false analogy has not been corrected by the Colleges; the product of the above process being a mild muriate of mercury mixed with subnitrate of mercury which modifies its powers, a smaller proportion also of mild muriate being obtained than should follow from the quantity of mercury employed. The cause of this effect is, that by dissolving mercury in nitric acid with the assistance of heat, the metal contained in the acid solution is oxidized to a maximum, and when water is added to it, a subnitrate is precipitated, while a supernitrate remains in solution. Hence, on the addition of the watery solution of muriate of soda, the water occasions the subnitrate to be precipitated, before the decomposition which takes place is effected, at the same time part of the oxide com-

bines with the acid of the muriate of soda, and forms a portion of corrosive muriate which is held in solution with the newly formed nitrate of soda, while the mild muriate is precipitated in combination with insoluble subnitrate of mercury.

To obtain, therefore, the greatest proportion of pure mild muriate of mercury by precipitation, the nitrate must be prepared slowly, and without the aid of heat, which should not be employed in any part of the process. Dr. Murray ascertained, that "the quantity of mild muriate obtained from a solution of 3j. of mercurin diluted nitric acid in the cold, is a little more than 3j.; while from the same quantity dissolved with the application of heat, the precipitate did not exceed 3fs, while the liquor held dissolved much more corrosive muriate than the other."

Qualities.—Precipitated mild muriate of mercury, when properly prepared, is inodorous and insipid. It is whiter, smoother, and lighter, than the sublimed preparation, but otherwise agrees with it, both in its chemical qualities, and medicinal effects. As prepared, however, according to the directions of the pharmacopœias, subnitrate of mercury, which it contains, may have some effect in altering its powers in a small degree.

Medical properties and uses.—It is said to be more liable to run off by the bowels than common calomel; but as its properties are essentially the same, it may be regarded as a superfluous preparation.

HYDRARGYRI SULPHURETUM NIGRUM. *Lond.*
Black Sulphuret of Mercury.

"Take of purified mercury, *one pound*; sublimed sulphur, *a pound*. Triturate them together until the globules disappear."

SULPHURETUM HYDRARGYRI NIGRUM. *Edin.*
Dub. Black Sulphuret of Mercury.

"Take of purified mercury, sublimed sulphur, of each *equal weights*. Rub them together in a glass mortar with a glass pestle, until the globules of mercury altogether disappear. It may be made with double the quantity also of mercury."

During the trituration of the mercury with the sulphur, Fourcroy supposes that the metal is imperfectly oxidized by attracting oxygen from the atmosphere; but this opinion has been disproved by the experiments of Proust¹; and although a chemical combination be effected between the mercury and the sulphur, yet the real nature of the preparation is not understood.

¹ *System of Materia Medica*, &c. ii. 319.

² *Hydrargyrus e Sulphure*, P. L. 1787. *Sulphure de Mercure noir* (F.) *Schwarzes Schwefelquecksilber* (G.) *Solfuro di Mercurio nero* (I.)

³ *Journal de Physique*, liii. 92.

Qualities. — Black sulphuret of mercury is in the form of a very black, impalpable, inodorous, insipid powder. When heated in an open vessel it emits sulphurous acid gas; becomes first of a deep violet hue, and afterwards sublimes of a brilliant red colour. It is insoluble in nitric acid, but is totally dissolved by a solution of pure potash, from which the acids precipitate it unchanged. It is often ill prepared, which may be known by rubbing a portion of it on gold; to which, if it be good, no whiteness will be communicated. It is, also, sometimes adulterated with ivory-black, which may be detected in it by throwing a little of the suspected sulphuret on a red-hot iron; if ivory-black be present, some ashes will be left after the volatilization, which will not be the case, when it is good, the pure sulphuret being completely dissipated.

Medical properties and uses. — This mercurial preparation is alterative and anthelmintic. It is chiefly employed against scrophulous swellings, and in cutaneous affections; and has been found useful in ascarides. But it is on the whole a very uncertain preparation, and requires to be long used to produce any sensible effects. The dose is from grs. v. to 3fs, given twice or three times a day.

HYDRARGYRI SULPHURETUM RUBRUM.
Lond. *Red Sulphuret of Mercury.*

“Take of purified mercury, *forty ounces*; sublimed sulphur, *eight ounces*. Having melted the sulphur over the fire, mix in the mercury, and, immediately the mass swells, remove the vessel from the fire, and cover it with force to prevent it from catching fire; then rub it into powder and sublime.”

SULPHURATUM HYDRARGYRI RUBRUM. Dub. *Red Sulphuret of Mercury.*

“Take of purified mercury, *forty ounces*; sublimed sulphur, *eight ounces*. Mix the mercury with the melted sulphur; and if the mixture take fire, extinguish it by covering the vessel; then rub the mass to powder, and sublime it.”

By these processes the mercury and sulphur are more intimately combined, and a more complete sulphuret produced than in the former preparation. The inflammation which is apt to happen after the mixture of the mercury with the melted sulphur, when the mass swells and explodes, as frequently occurs, is similar to the combustion during the union of sulphur by heat with some other metals, independent of the presence of air: hence, covering the vessel, without removing it from the fire, does not check the combustion,

¹ *Cinnabaris factitia*, P. L. 1745. *Hydrargyri sulphuratus ruber*, P. L. 1787. *Sulphure de Mercure rouge* (F.) *Zinnober* (G.) *Solfuro di Mercurio rosso* (I.) *Shengert* (H.)

although, by excluding the air, a real inflammation of the materials may be prevented. In the second part of the process great caution is necessary to prevent the neck of the vessel in which it is sublimed from being choaked up by the sublimed sulphuret; as by the occurrence of such an accident the vessel would be burst by the confined vapours. To avoid this, a wide-necked vessel should be used.

The cinnabar of commerce, which is chiefly used as a pigment, is manufactured in Holland, on a very extensive scale¹; and the following method has been proposed by Mr. Kirchoff, for obtaining it in the humid way. First, form ethiops mineral, by triturating, in a porcelain cup with a glass pestle, 300 grains of mercury, and 68 of sulphur, moistened with a few drops of solution of potash, and then add to it 160 grains of potash, dissolved in an equal weight of water. Heat the vessel with the ingredients over the flame of a candle, continuing the trituration, and adding, as the fluid evaporates, pure water from time to time, so as to keep the ingredients covered to the depth of an inch. At the end of two hours, if the trituration has been continued, the colour of the mixture changes from black to brown, and then to red; after which no more water should be added, but the trituration must be uninterruptedly continued until the mass have acquired the consistence of a jelly, and the red colour attained considerable brightness and beauty: the heat must be then immediately withdrawn, otherwise the red soon changes to a dirty brown.²

Qualities. — Red sulphuret of mercury sublimes in the form of a vivid red crystalline cake, and yields, by trituration, a powder of a very bright red colour, which is indorous, insipid, and insoluble in water, alcohol, and the acids. It is decomposed, however, by nitro-muriatic acid, which combines with the mercury, and disengages the sulphur; but is not altered by solutions of the alkalies, even when boiled with them; although potash, soda, and most of the metals decompose it when melted with it. Vauquelin supposed that it contains the metal in a state of high oxidizement; a supposition which the experiments of Proust and Seguin have completely disproved. According to Proust, 100 parts of the sulphuret consist of 85 of unoxidized mercury, and 15 of sulphur; but according to the latter experiments of Guibourt³, the proportions are 86.1803 of mercury and 13.8197 of sulphur. This preparation is sometimes adulterated with red-lead, dragon's blood, and chalk; the first is discovered by the same process

¹ See a description of the method, *Annales de Chimie*, li. 196.

² Nicholson's *Journal*, 4to. ii. 1.

³ *Journ. de Pharmacie*, Aout. 1816. p. 371.

as was described for discovering it in the red oxide; spirit of wine detects the second by extracting the colouring matter; and the last is discovered by an effervescence being excited by muriatic acid; and the production of sulphate of lime on adding sulphuric acid.

Medical properties and uses. — Red sulphuret of mercury is alterative and deobstruent. It was formerly much used in cutaneous diseases, gouty and rheumatic affections, and in worms. It is now, however, scarcely ever prescribed. It has been recommended for fumigations in syphilis; but on account of the sulphurous vapours it is less fit for this purpose than the grey oxide. The dose for internal use is from grs. x. to 3℥s. made into an electuary or bolus.

SUB-SULPHAS HYDRARGYRI FLAVUS.* Edin.

Yellow Sub-Sulphate of Mercury.

“Take of purified mercury, *two parts*; sulphuric acid, *three parts*. Put them into a glass cucurbit, placed in a sand-bath, and boil them to dryness. Pulverize the white mass which is left at the bottom of the vessel, and throw it into boiling water. It will immediately be converted into a yellow powder, which is to be washed with frequent affusions of warm water.”

OXYDUM HYDRARGYRI SULPHURICUM. Dub. *Sulphuric Oxide of Mercury.*

“Take of purified mercury, *a pound*; sulphuric acid, *a pound and a half*. Dissolve in a glass vessel, with a sufficiently strong heat, and gradually raise the fire until the mass be completely dried. This, by the affusion of a large quantity of hot water, will immediately become yellow and fall into powder, which is to be well triturated with the water in an earthen-ware mortar.

“After pouring off the supernatant fluid, let the powder be washed with repeated affusions of hot distilled water, as long as any precipitate is produced in the decanted liquor on the addition of a few drops of water of subcarbonate of kali; and, lastly, dry it.”

Sulphuric acid scarcely acts on mercury unless aided by a high temperature. When it is boiled on it, as directed in these processes, the acid is partially decomposed by the metal which is oxidized, while sulphurous gas is evolved; and the oxide thus formed uniting with the remaining acid, the whole becomes a supersulphate of mercury. By continuing the application of heat, at a higher temperature, a consider-

* *Hydrargyrum vitriolatus*, P. L. 1787. Subsulphate de Mercure (F.) Gelbes Schwefelsaures Quecksilberoxyd (G.) Turpeto Minerale Mercuriale (I.)

able portion of the acid is expelled, and partly decomposed, by which the metal is still more highly oxidized, and the resulting dry mass is a subsulphate of mercury. When boiling water is poured on this salt, the fluid, acting by its powerful affinity for sulphuric acid, decomposes it, abstracts the acid, and precipitates the oxide; but as the acid still holds combined with it a small portion of oxide, and the precipitated oxide retains some acid, the result of this part of the process is a supersulphate of mercury held in solution by the water, and a sub-sulphate precipitated in the form of a yellow powder. To obtain this effect completely, the saline mass must be made entirely dry before pouring over it the hot water; for if the vessel be sooner taken from the fire, the precipitation is partial only, the greater part of the salt being dissolved without being decomposed. Perhaps the best mode is to continue the exsiccation until a little of the white mass dissolved in cold water does not redden litmus paper. The proportions for obtaining the largest quantity of product are two parts of acid, and one of mercury: hence, while the quantity ordered by the Dublin College is rather too small, the proportions of the Edinburgh formula are productive of a very unnecessary waste of acid.

Qualities. — Subsulphate of mercury is inodorous, and acrid to the taste. It is obtained in the form of a beautiful bright yellow powder, of a specific gravity of 6.444, and nearly insoluble in water, requiring 2000 parts at 60°, and 600 at 212°, for its solution, which is colourless. By trituration with mercury it is changed into the black oxide; and at a red heat is decomposed, the oxygen being given out and the metal reduced. According to the analysis of Braumcamp and Segueira, its constituents are 84.7 parts of oxide of mercury, 15 of sulphuric acid, and three of water¹; while Fourcroy makes them 87 of oxide, 10 of acid, and three of water.

Medical properties and uses. — This preparation is emetic, discutient, alterative, and errhine; but from the violence of its action it is seldom administered as an internal remedy. As an errhine, however, it has been found extremely useful in chronic ophthalmia, and diseases of the head; but even for this purpose its acrimony requires to be sheathed with some bland powder, as starch, or liquorice root powder, in the proportion of grs. v. to gr. j. of the subsulphate. In doses of gr. v. it operates as a very powerful emetic.

HYDRARGYRUM CUM CRETA. Lond. *Mercury with Chalk.*²

¹ *Annales de Chimie*, liv. 123.

² *Mercurius alkalizatus*, P. L. 1745.

“Take of purified mercury, *three ounces*; prepared chalk, *five ounces*. Rub them together until the globules disappear.”

HYDRARGYRUM CUM CRETA. Dub. *Mercury with Chalk.*

“It is prepared in the same manner as the mercury with magnesia, only instead of magnesia employing precipitated chalk.”

In these processes the mercury is slightly oxidized during the trituration, and is in the state of the black oxide, 100 parts of which, according to Fourcroy, contain, when well prepared, about 4 of oxygen.

Medical properties and uses. — It is alterative, and is occasionally prescribed in tinea capitis, and other cutaneous affections; but it merits attention as a mild alterative for children. The dose may be from grs. v. to ʒss. given twice a day, mixed in any viscid substance.

HYDRARGYRUM CUM MAGNESIA. Dub. *Mercury with Magnesia.*

“Take of mercury, manna, of each *an ounce*; magnesia, *half an ounce*. Triturate the mercury with the manna in an earthen mortar, adding as many drops of water as will give to the mixture the thickness of syrup, and continue the rubbing until the metallic globules completely disappear; then add, still tritulating, *a drachm* of magnesia; and after the whole is well mixed together, add *a pint* of hot water, and agitate the mixture. Allow the mixture to remain for some time at rest, in order that the sediment may subside, from which the fluid is to be decanted. Repeat the washing a second and a third time, that the whole of the manna may be removed; and add the remainder of the magnesia to the sediment while it is still moist. Finally, dry the powder upon bibulous paper.”

The addition of the manna in this process, and in the former preparation with chalk of the Dublin College, is intended only to facilitate the oxidizement of the mercury; and therefore it is afterwards removed by the subsequent washings, so that the product remains a grey or black oxide of mercury, mixed with magnesia. It is a preparation which might well be rejected.

HYDRARGYRUM PRÆCIPITATUM¹ ALBUM. Lond. *White Precipitated Mercury.*²

“Take of oxymuriate of mercury, *half a pound*; muriate of ammonia, *four ounces*; solution of subcarbonate of potash, *half a pint*; distilled water, *four pints*. Dissolve first the muriate

¹ This name is completely at variance with the principles on which the reformed nomenclature is founded; and the reasons which might have excused the adoption of *calomel*, and some other equally barbarous terms, cannot be advanced in justification in this instance.

² *Mercurius præcipitatus albus*, P. L. 1745. *Calx hydrargyri alba*, P. L. 1787. *Muriate de mercure précipité* (F.) *Salzsäures Quecksilber präzipitat* (G.) *Precipitato bianco di mercurio* (I.)

of ammonia, then the oxymuriate of mercury, in the distilled water, and add to the mixed solution the solution of subcarbonate of potash. Wash the precipitated powder until it become tasteless, and then dry it."

SUBMURIAS HYDRARGYRI AMMONIATUM. Dub. *Ammoniated Submuriate of Mercury.*

"Add to the fluid which has been poured off from the precipitated submuriate of mercury a quantity of water of caustic ammonia sufficient to precipitate the whole of the metallic salt. Wash the precipitate with cold distilled water, and dry it upon bibulous paper."

As the products of these two processes are precisely the same, that of the Dublin College is to be preferred, both on account of its economy, and its greater simplicity. The fluid it orders to be used, is that which is decanted from the precipitated mild muriate of mercury, prepared by heat; and which, as we have already observed, holds the corrosive muriate in solution; so that the oxide of this salt is precipitated by the ammonia, combined with a portion of acid and also of ammonia, forming a ternary compound, or a submuriate of mercury and ammonia. In the London process, the muriate of ammonia, and the oxymuriate of mercury, when dissolved in the water, combine together, and form a solution of a ternary compound of muriatic acid, ammonia, and oxide of mercury, or a soluble supermuriate of mercury and ammonia. By the addition of the subcarbonate of potash, a great part of the acid, both of the muriate of ammonia, and of the mercurial salt, is abstracted, and the same triple insoluble compound is precipitated as in the former process; and the fluid retains in solution muriate of potash, the carbonic acid having been dissipated in the gaseous form. It is to be regretted, that the quantity ordered is inadequate to the effect intended.

Qualities. — This muriate of mercury and ammonia is inodorous and insipid; of a snowy whiteness, smooth, and insoluble in water, and does not become black when triturated with lime water. It is decomposed by the sulphuric and nitric acids, the former of which converts it into oxymuriate of mercury and sulphate of mercury and ammonia, and the latter into the oxymuriate also, and nitrate of ammonia and mercury. Muriatic acid restores it to the state of soluble supermuriate, the *sal alemroth* of the old chemists. According to Fourcroy's analysis, its constituents are, 81 parts of oxide of mercury, 16 of muriatic acid, and 3 of ammonia. It is sometimes adulterated with white lead; to discover which, digest one part of it in four parts of acetic acid, and add to the solution a small quantity of sulphuret of ammonia; a black precipitate insoluble

in sulphuric acid indicates the presence of lead. Chalk and starch are also sometimes mixed with it; and may be detected by heating the preparation in an iron spoon: if pure, it is completely volatilized; but if adulterated with starch, a black coal is left; or, if with chalk, a white powder, at the bottom of the spoon.

Medical properties and uses. — This preparation is only used, in combination with lard, as an ointment for the cure of itch, and some other cutaneous eruptions.

Official preparation. *Unguentum Hydrargyri præcipitati albi.* L. D.

HYDRARGYRUM PURIFICATUM. Lond. *Purified Mercury.*¹

“Take of mercury, *six pounds*; filings of iron, *a pound*. Rub them together, and distil the mercury from an iron retort.”

HYDRARGYRUS PURIFICATUS. *Purified Mercury.* Edinburgh.

“Take of mercury, *six parts*; filings of iron, *one part*. Rub them together, and distil from an iron retort.”

HYDRARGYRUM PURIFICATUM. Dub. *Purified Mercury.*

“Take of mercury, *six pounds*. Distil off slowly four pounds.”

By this mode of treating mercury it is certainly obtained more bright and mobile; but although it is generally supposed that the iron operates by exerting a superior affinity for the foreign metals with which the mercury of commerce is supposed to be alloyed, yet this is altogether hypothetical, and the necessity of the process may be well questioned.

LIQUOR HYDRARGYRI OXYMURIATIS. Lond. *Solution of Oxymuriate of Mercury.*

“Take of oxymuriate of mercury, *eight grains*; distilled water, *fifteen fluid ounces*; rectified spirit, *a fluid ounce*. Dissolve the oxymuriate of mercury in the water, and add to it the spirit.”

This solution is intended to facilitate the administration of minute doses of oxymuriate of mercury, each fluid ounce of the solution containing half a grain of the salt. It ought not to be long kept or exposed to a clear light, as the oxymuriate is gradually decomposed, and calomel precipitated. It is, however, the most safe and convenient form of administering this active salt; and may be given as an antisymphilitic in doses of from fʒss. to fʒij. in fʒij. of linseed infusion, or water and syrup, and in more minute doses when its alterative effects

¹ Argentum vivum purificatum, P. L. 1745. Mercure (F.) Quecksilber (G.) Mercurio (I.) Azogue (S.)

only are required. As a local application, this solution, diluted with two parts of water forms a useful gargle in venereal sore throat; and without dilution we have found it serviceable as a gargle for breaking the abscess in cynanche tonsillaris, when suppuration takes place. Diluted with an equal quantity of water, it is employed as a wash against tetter and scabies; and very largely diluted, it may be used as an injection in gonorrhœa: or given in the form of enema, when the stomach will not receive it.

In concluding the account of the preparations of mercury, it may not be improper to observe that the exhibition of any of them in certain states of the habit, and at the time under exposure to cold, is apt to excite an erythematic eruption of the skin, accompanied with much fever. This disease does not at all depend on the use of any particular preparation of the remedy; but, as far as I have been able to observe, it is liable to show itself in such an irritable state of the habit as produces hysteria in females, when the body is very suddenly exposed to a current of cold air, or to a cold moist atmosphere, while under the influence of mercury. When it occurs, the mercurials must be immediately discontinued, bark, opium, and purgatives internally administered, and the affected surface sprinkled with dry flour, or covered with the *linimentum aquæ calcis* of the Edinburgh and Dublin pharmacopœias; while at the same time the warm bath is to be used at least twice a day. Under this treatment the disease generally disappears, and the use of the mercurial may be renewed; but sometimes the morbid symptoms increase under every mode of treatment, and a fatal termination of the disease ensues.

PRÆPARATA E STANNO.

PREPARATIONS OF TIN.

PULVIS STANNI. Dub.* *Powder of Tin.*

“Take of tin, *any quantity*. Melt it over the fire in an iron mortar, and stir it while it is cooling, until it becomes a powder, which, when cold, is to be passed through a sieve.”

* Poudre d'Étain (F.) Zinn (G.) Stagno in polvere (I.)

By this process tin is reduced to the form of a fine granular powder, and, perhaps, by the constant stirring, it is also very slightly oxidized, for the powder has less brilliancy than the entire metal.

Medical properties and uses. — Powder of tin is a mechanical anthelmintic. It has been chiefly given in tænia; and is supposed to operate by the grittiness of its particles irritating the worm, and dislodging it from the mucus in which it is imbedded. It is given in doses of ʒj. or ʒij. mixed in treacle, for two or three successive mornings, and a brisk cathartic afterwards exhibited. But it is likely to be, henceforth, seldom used, oil of turpentine being a much superior remedy for the expulsion of tænia.

PRÆPARATA E PLUMBO.

PREPARATIONS OF LEAD.

LIQUOR PLUMBI SUBACETATIS. Lond. *Solution of Subacetate of Lead.*

“Take of semi-vitrified oxide of lead, *two pounds*; acetic acid (distilled vinegar), *a gallon*. Mix them, and boil down to six pints, assiduously stirring; then set the solution aside, that the impurities may subside, and strain it.”

LIQUOR SUBACETATIS LITHARGYRI. Dub. *Solution of Subacetate of Lead.*

“Take of litharge, *a pound*; distilled vinegar, *eight pints*. Put them into a glass vessel, and boil to six pints, assiduously stirring; then set the solution aside, and strain it after the fæces have subsided.”

In these processes, the acetic acid, which the distilled vinegar contains in a highly diluted state, attracts a portion of the oxide of lead, and forms an acetate, which remains dissolved in the water. The two Colleges err in naming it a subacetate. The proportion of litharge ordered in both formulæ is too large, a gallon of distilled vinegar of the specific gravity 1·007 being capable of dissolving ten ounces only of the oxide.

Qualities. — This solution of acetate of lead, when properly prepared with pure distilled vinegar, is of a greenish straw-colour, has a slight acetous odour, and an austere somewhat sweetish taste. It is partially decomposed when largely di-

¹ Aqua lithargyri acetati, P. L. 1797. Acetate de Plomb liquide (F.) Blaiwasser (G.) Aceto di Saturno (L.)

luted with distilled water; and with pump water, a heavy precipitate instantly takes place: it is also precipitated in the form of a white sub-salt by the alkalies and their carbonates; and a black precipitate is produced by the alkaline sulphurets. This solution is also incompatible with solutions of mucilage, the gum of which it coagulates; and, indeed, it is the most delicate test for mucilage with which we are acquainted. According to the experiments of Dr. Bostock¹, the constituents of 100 parts of the saturated solution are 23.1 of oxide of lead, 5 of acetic acid, and 71.9 of water, which agree with the statement of Thenard², who found that the salt, when crystallized, consists of 17 parts of acid, 78 of oxide of lead, and 5 of water, in 100 parts.³

Medical properties and uses.—This solution is used only externally, and when diluted with water forms a very useful cooling, discutient application to phlegmonous inflammations and burns. It was introduced into practice by M. Goulard, a surgeon of Montpellier; and hence was long distinguished by the appellation of Goulard's Extract.

LIQUOR PLUMBI SUBACETATIS DILUTUS. Lond. *Diluted Solution of Subacetate of Lead.*⁴

"Take solution of subacetate of lead, *a fluid drachm*; distilled water, *a pint*; proof spirit, *a fluid drachm*. Mix."

LIQUOR SUBACETATIS LITHARGYRI COMPOSITUS. Dub. *Compound Solution of Subacetate of Litharge.*

The same as the London formula, with double the quantity of each of the ingredients.

This preparation, as an article in the pharmacopœia, is superfluous, every surgeon being in the habit of ordering lotions with different proportions of the solution of acetate of lead, according to the circumstances of the case.

PLUMBI SUPERACETAS. Lond. *Superacetate of Lead.*⁵

"Take of carbonate of lead, *a pound*; acetic acid (distilled vinegar), *a gallon and a half*. Boil the carbonate of lead with the acid until this is saturated; then filter the solution through paper, and, having evaporated it until a pellicle appears on its

¹ Nicholson's Journal, xi. 75.

² Ibid. vi. 223.

³ The nature of the salt in this solution was first pointed out by Scheele, who changed a solution of the superacetate of lead into Goulard's extract, by keeping it in a plate of lead for the space of a day; but this experiment was over-looked until Dr. Bostock's analysis of the preparation. An excellent mode of preparing it is employed in the French Hospitals. Three parts of superacetate of lead is dissolved in a sufficient quantity of hot distilled water, and to the solution one part of semi-vitreous oxide of lead is added, in fine powder. The whole is then evaporated until it marks 28° of Beaumè's areometer; and when cold filtered. Vide Journ. de Pharm. Dec. 1876. p. 565.

⁴ Aqua lithargyri acetati composita, P. L. 1787.

⁵ Saccharum saturni, P. L. 1720—45. Cerussa acetata, P. L. 1787. Acetate de Plomb cristallisé (F.) Essigsaures Blei (G.) Zuccherro di Saturno (I.)

surface, set it apart that crystals may form. Pour off the fluid, and dry the crystals upon bibulous paper."

ACETAS PLUMBI. Edin. *Acetate of Lead.*

"Take of white oxide of lead, *any quantity*; weaker acetic acid, *a sufficient quantity*. Put the oxide into a cucurbit, and pour over it ten times its weight of the acid. Let the mixture stand upon a warm sand-bath until the acid becomes sweet; then let this be poured off, and add fresh portions of acid successively, until no more sweetness is communicated. Evaporate all the fluid, freed from impurities, in a glass vessel to the consistence of thin honey, and set it aside in a cold place that crystals may form, which are to be dried in the shade. Evaporate again the residuary liquor, that new crystals may be obtained; and repeat the evaporation until no more are formed."

ACETAS PLUMBI. Dub. *Acetate of Lead.*

"Take of subacetate of lead, called CERUSSA, *any quantity*, distilled vinegar, *ten times its weight*. Digest them in a glass vessel until the vinegar becomes sweet; and having poured this off, add more, until it ceases to become sweet. Filter the solution, and crystallize by alternate slow evaporation and cooling. Dry the crystals in the shade."

In these processes the acetic acid of the distilled vinegar unites with the oxide of lead of the carbonate; and by the subsequent evaporations the salt crystallizes in the form of an acetate. But on account of the smallness of the quantity of product, the trouble and expence of the process, and the difficulty of obtaining the white lead perfectly free from whitening (carbonate of lime), with which it is generally adulterated, the preparation of this salt is seldom undertaken by the apothecary; so that the superacetate usually found in the shops is the salt which is manufactured on a large scale, for the use of the calico-printers, purified. It is chiefly prepared in Holland, in the following manner: Sheets of lead, coiled up, are put into pots, in which they are half immersed in distilled vinegar, and digested a sufficient time. Before long the upper half, or that which is not immersed, is covered with an efflorescence of cerusse, after which it is immersed in the vinegar, and the part which was before immersed is now brought up to be converted into cerusse as before, when the plate is again turned; and this is repeated two or three times a day, until the vinegar becomes milky. This solution is next boiled in tinned vessels down to about one-third of the original quantity, then strained, and the salt crystallized by slow cooling. The crystals obtained by a second evaporation

of the mother-water are browner, and deliquescent¹; and as these are generally mixed with the others, the whole requires to be again dissolved in rain or distilled water, and re-crystallized, before they are fit for medicinal purposes.

Qualities.—This salt, when pure, is inodorous, has a sweet, astringent taste, and crystallizes in white glossy, acicular, flat, four-sided prisms, terminated by dihedral summits, which are generally aggregated into irregular masses that have the appearance of lumps of sugar. Its specific gravity is 2.35.² Acetate of lead slightly effloresces, is soluble in 25 parts of distilled water either hot or cold; but after standing for some time a slight decomposition takes place, and a small portion of white powder is deposited, which is an insoluble carbonate. It is also soluble in alcohol. In pump or hard water it is instantly decomposed, forming a milky solution, and a copious precipitate falls. It is decomposed by the alkalies and their carbonates, most of the acids, and neutral salts, lime, and magnesia; but it does not affect a solution of gum. According to the analysis of Thenard, the constituents of 100 parts are 58 of oxide of lead, 26 of acid, and 16 of water.³

Medical properties and uses.—Taken internally, superacetate of lead is a very powerful astringent, and sedative. It requires to be exhibited, however, with caution, and is admissible only in cases of very urgent danger, as in violent pulmonary and intestinal hæmorrhages, in restraining which it has a very powerful influence. Combining it with opium prevents the deleterious effects which salts of lead are apt to produce when taken into the stomach; but, even when so combined, the smallest dose, in certain habits, is productive of very serious mischief. Some years ago, Dr. Hildebrand of Lemberg tried this salt in combination with opium with seeming advantage in phthisis; and it has been since occasionally used in this country; but from the effects of it in that disease, as far as I have observed, it is not likely to be generally employed by British practitioners. Dissolved in a large proportion of water, it forms an excellent collyrium in ophthalmia; and somewhat less diluted, its solution is in common use as an external application in superficial inflammation. Objections have, nevertheless, been raised to the long-continued external use of the preparations of lead; but the daily extensive employment of them in this form, without any bad effects, is a sufficient proof that, if they occasionally have produced mis-

¹ *Aikin's Dictionary of Chemistry*, ii. 26.

² Hassenfratz.

³ *Nicholson's Journal*, vi. 228.

chief, it is rather to be attributed to some peculiar idiosyncrasy, than to the nature of the remedy.

The dose of superacetate of lead, when internally exhibited, should not exceed gr. fs. given every six or eight hours. It may be made into a pill with crumb of bread, and a proportion of opium, according to the circumstances of the case. As a collyrium or lotion, the proportions may be from gr. x. to ℥j. of the salt in fʒviij of distilled water. The addition of a small quantity of distilled vinegar is necessary to prevent decomposition, when distilled water is not employed.

Official preparation. *Ceratum Plumbi Superacetatis*. L. E. D.

PRÆPARATA E ZINCO.

PREPARATIONS OF ZINC.

CALAMINA PRÆPARATA. Lond. *Prepared Calamine.*

“Burn the calamine, and beat it to powder; then bring it into the state of a very fine powder, in the manner directed for the preparation of chalk.”

CARBONAS ZINCI IMPURUS PRÆPARATUS. E. *Prepared impure Carbonate of Zinc.*

“Impure carbonate of zinc, roasted by those who make brass, being rubbed to powder in an iron mortar, and levigated with a little water in a porphyry, is to be put into a large vessel, and water poured over it, which after frequently agitating the vessel, is to be poured off loaded with the powder. The fine powder which subsides after the water has remained at rest, is then to be dried. The coarse, which the water cannot suspend, is to be again levigated, and treated as before.”

LAPIS CALAMINARIS PRÆPARATUS. Dub. *Prepared Calamine Stone.*

“Reduce calcined calamine stone to powder, and separate the very fine parts in manner directed for the preparation of chalk.”

The nature of this ore of zinc has been already stated, (Part ii.) As it is frequently used in the form of a dry powder to excoriations, ichorous ulcers, and superficial inflamma-

¹ Calamine préparé (F.) Galmei (G.) Calamina (I.)

tions, dusted on the part, it requires to be rendered extremely fine.

Official preparations. *Ceratum Calaminæ*. L.E. *Unguentum Calaminaris*. D.

OXIDUM ZINCI IMPURUM PRÆPARATUM. Edin. *Prepared impure Oxide of Zinc*.

"It is prepared in the same manner as the impure carbonate of zinc."

This substance, the nature of which has been already stated, (*Part ii.*) is used for the same purposes as the former article.

ZINCI OXYDUM. Lond. *Oxide of Zinc*.¹

"Throw, gradually, small pieces of zinc into a large deep crucible, heated to whiteness, and inclined to one side, with another crucible placed over it in such a manner that the zinc may be exposed to the action of the air, and frequently stirred with an iron rod. Remove, from time to time, the oxide as it forms, and pass the white and lighter part of it through a sieve. Lastly, pour water upon this, so that an impalpable powder may be formed in the same manner as ordered for the preparation of chalk."

OXIDUM ZINCI. Edin. *Oxide of Zinc*.

"Let a large crucible be placed in a furnace filled with burning coals, in such a manner as to be somewhat inclined to its mouth, and when the bottom of it is heated to a moderate degree of redness, throw into it a piece of zinc about the weight of one drachm. The zinc is soon inflamed, and converted into white flocculi, which are occasionally to be removed from the surface of the metal by means of an iron spatula, that the combustion may be more complete; and when the inflammation is over, remove the oxide of zinc from the crucible. Throw in then another piece, and let the operation be repeated as often as is necessary. Finally, let the oxide of zinc be prepared in the same manner as the impure carbonate of zinc."

Dublin.

"Take of zinc broken into small pieces, *any quantity*. Throw these, at intervals, into a sufficiently large crucible heated to whiteness, and placed with its mouth inclined towards the mouth of the furnace. After each piece of zinc is thrown in, invert over the crucible another crucible, but loosely so as not to exclude the air. Preserve the light, very white, sublimed powder for use."

¹ The ancients, who were acquainted with it, called it pompholyx; and by the early chemists it was named *Nihil album*, *Lana philosophica*, and *Flores zinci*. *Zincum calcinatum*, P.L. 1787. *Oxide de Zinc* (F.) *Weisser Zinkoxyd* (G.) *Per Ossido di Zinco*; *fiore di Zinco* (I.)

In these processes, the crucible must be heated above 700° of Fahrenheit, which is the point of ignition of zinc. At this temperature the metal inflames, burning with a dazzling white and green flame; and by attracting the oxygen of the air is converted into a white oxide, which is partly volatilized in the form of very light-flocculi. The elevation of these flocculi, however, is owing to the current of air excited by the force of the combustion; for the oxide itself is not volatile, but accumulates in the crucible so rapidly, that it must be withdrawn to allow the access of the air for keeping up the combustion. If the crucible be sufficiently capacious, there is no necessity for covering it with another, by which the operation is always impeded. The subsequent levigation is intended to remove any particles of metallic zinc, which are generally involved in the oxide.¹

Qualities. — Oxide of zinc thus prepared is inodorous, insipid, of a pure white colour, infusible in the fire, insoluble in water and alcohol, but entirely soluble in acids, and is not altered by exposure to the air. According to Proust, 100 parts of it consist of 80 of zinc, and 20 of oxygen; or 100 zinc + 25 oxygen. It often contains small portions of carbonic acid.² It is often adulterated with chalk, and sometimes contains white lead. By pouring sulphuric acid on the specimen, the first is discovered by the effervescence that is excited, the second by an insoluble sulphate of lead being formed.

Medical properties and uses. — Oxide of zinc is tonic and antispasmodic; and has been advantageously used in chorea, epilepsy³, and some other spasmodic affections. It has been employed in hooping-cough on the continent; and Loeffler recommends it to be used externally as well as internally in that disease. He employs a liniment composed of linseed oil, and oxide of zinc. It is chiefly used as an external application. (See *Ung. Zinci*.)

The dose, as an internal remedy, may be from gr. j. to grs. vj. given twice a day.

Official preparation. *Unguentum Zinci.* L. E. D.
ZINCI SULPHAS. Lond. *Sulphate of Zinc.*

“Take of zinc broken into small pieces, *three ounces*; sul-

¹ This oxide may also be readily prepared by dissolving zinc in diluted sulphuric or nitric acid, and precipitating by potash, a process proposed by Marabelli, Professor of Pharmacy at Pavia, in 1798. The washed precipitate is oxide of zinc, containing, according to Vauquelin, 0.21 of oxygen.

² *Annales de Chimie*, xxxv. 51. The more recent experiments of Dr. Thomson make the proportions to be metal 100 + 24.16 oxygen; those of Berzelius, metal 100 + 24.4 oxygen.

³ *Duncan's Med. Comment.* iii. 216.

⁴ *Zincum vitriolatum*, P.L. 1787. *Sulphate de Zinc* (F.) *Schwefelsaurer Zink* (G.) *Solfato di Zinco* (I.) *Vitriolo bianco* (S.)

phuric acid, *five ounces*; water, *four pints*. Mix them in a glass vessel, and the effervescence being over, filter the solution through paper; then boil it until a pellicle begins to form on the surface, and set it aside to crystallize."

Edinburgh.

"Take of zinc cut into small pieces, *three parts*; sulphuric acid, *five parts*; water, *twenty parts*. Mix them, and the effervescence being finished, digest for a short time on hot sand. Then filter the decanted solution through paper, and after due evaporation, set it apart that crystals may be formed."

Dublin.

"Take of zinc reduced to powder in the same manner as tin, *three ounces*; sulphuric acid, *five ounces*; water, *a pint*. Pour the acid previously diluted with the water upon the zinc, put into a glass vessel; digest for a short time after the effervescence ceases; then evaporate to a proper point the strained solution, and set it aside to crystallize."

The directions of the Dublin College for granulating the zinc are to be adopted in preference to those of the other Colleges for dividing it. In these processes, the acid enables the zinc to decompose the water, and the metal is oxidized by attracting its oxygen, while its hydrogen is disengaged with effervescence. The oxide thus formed combines with the acid, forming sulphate of zinc, which is obtained in crystals by the subsequent evaporation. The greater part, however, of the sulphate of zinc of the shops is prepared on a large scale, and purified in the manner that shall be immediately noticed. It is denominated *white vitriol* in the language of commerce, and is manufactured largely both in Germany¹ and England. In Germany it is prepared by exposing roasted blende to the air and humidity; by which means the metal is gradually oxidized, and combined with the sulphuric acid also formed from the sulphur contained in the blende. The sulphate thus produced is separated from the earthy parts of the blende by lixiviation, and after being boiled down is crystallized, or rather concentered, into hard granular masses resembling loaf sugar, which generally contain sulphate of iron, of lead, and sometimes of copper. In England it is prepared generally by the direct combination of its constituents; but although purer than the foreign salt, yet the English white vitriol, almost always, contains iron. Both kinds are purified by solution in water, and then allowing the solution to evaporate very slowly in an open vessel containing some granulated zinc; the sulphate of lead will subside, and

¹ Beckman, in his *History of Inventions*, says, it was first made at Ramelsberg, in Germany, about the middle of the 16th century; and ascribes the invention to Julius, duke of Brunswick.

the other foreign salts be decomposed by the metallic zinc. The purified sulphate of zinc may be then crystallized by lixiviation and evaporation.*

Qualities.—Pure sulphate of zinc, or rather *supersulphate*, for it contains an excess of acid and reddens the vegetable blues, is inodorous, and has a slightly acidulous, styptic, metallic taste. It crystallizes in transparent, colourless, flattish, tetrahedral prisms, terminated by quadrangular pyramids; effloresces slightly in the air; is soluble in 2.5 times its weight of water at 60°, and in less than its own weight of boiling water. It is decomposed by the alkalies, earth, and hydrosulphurets; and throws down a dirty-looking precipitate from astringent vegetable infusion, with which, therefore, it is incompatible in prescriptions. According to the analysis of Dr. Wollaston, the constituents of 100 parts of the pure crystallized salt are 28.4 of oxide of zinc, 27.3 of acid, and 44.3 of water.

Medical properties and uses.—Sulphate of zinc is tonic and astringent, and in large doses emetic. As a tonic, it is less heating and stimulant than sulphate of iron, and hence is preferable in phthisis and other diseases attended with great irritability and general weakness. It is also useful in dyspepsia, fluor albus, and some convulsive affections, as pertussis, chorea, and epilepsy; in which diseases it is generally combined with myrrh, bitter extracts, opium, extract of hemlock, or digitalis, according to the circumstances of the case. As an emetic it operates almost instantaneously, and therefore is often employed to empty the stomach at the commencement of the paroxysm of intermittent fever, and in other cases in which quick vomiting is required. As an external application this salt dissolved in rose-water, in the proportion of grs. ijs. to f3j. of rose-water, forms an excellent collyrium in the latter stage of ophthalmia, after the inflammatory action has subsided; it is a good injection in a similar stage of gonorrhœa; and a lotion in some kinds of superficial inflammations. In double the strength, this solution is the best application that can be used to scrophulous tumours, after they have suppurated, and the abscess has been discharged.

The dose to produce vomiting is from grs. x. to ʒss. and as a tonic from gr. j. to grs. ij. may be given twice a day.

Official preparations. *Solutio Sulphatis Zinci.* E. *Liquor Aluminis compositus.* L. *Solutio Acetatis Zinci.* E. D.

SOLUTIO SULPHATIS ZINCI. Edin. *Solution of Sulphate of Zinc.*

“Take of sulphate of zinc, sixteen grains; water, eight ounces; diluted sulphuric acid, sixteen drops. Dissolve the

* Aikin's Dictionary of Chemistry.

sulphate of zinc in the water, and having added the acid, filter the solution through paper."

This formula is given under the idea of the common sulphate of zinc, (which often contains some excess of oxide, and some oxide of iron,) being employed. The superabundant oxide, if present, is dissolved by the acid, so that a solution of an uniform strength is always obtained. It is rather too strong for the purposes of a collyrium in chronic ophthalmia; and the addition of the acid renders it less fit to be used as an injection in gonorrhœa.

SOLUTIO ACETATIS ZINCI. Edin.¹ *Solution of Acetate of Zinc.*

"Take of sulphate of zinc, *one drachm*; acetate (*superacetate*) of lead, *four scruples*; distilled water, *twenty ounces*. Dissolve. Mix the salts separately in ten ounces of the water; then mix the solutions, and after the precipitate subsides, filter."

In this process a double decomposition takes place: the sulphuric acid of the sulphate of zinc, unites with the oxide of lead of the superacetate of lead, whilst its acid combines with the disengaged oxide of zinc. The former salt being insoluble, is precipitated in the form of a heavy white powder, but the acetate of zinc remains dissolved; and thus its solution, which is colourless and limpid, is easily separated by filtration.

Medical properties and uses. — This solution is astringent; and was long employed before it was introduced into the pharmacopœia, and even before its nature was clearly understood. It is an useful collyrium in chronic ophthalmia, and in the acute variety of this disease after the inflamed vessels are unloaded, and the inflammatory action subdued. It is also an useful injection in the advanced state of gonorrhœa.

TINCTURA ACETATIS ZINCI. Dub. *Tincture of Acetate of Zinc.*

"Take of sulphate of zinc, acetate of kali, of each, *an ounce*. Rub them together, and add of rectified spirit of wine, *one pint*. Macerate for a week with occasional agitation, and filter through paper."

In this process, a double decomposition also takes place, acetate of zinc, and sulphate of potash being produced; the former of which is dissolved in the spirit, while the latter remains undissolved, and therefore is easily separated. It is a tedious process, and possesses no advantages over the former to recommend it.

Medical properties and uses. — This tincture is astringent; but requires to be diluted with water, before it can be used either as a collyrium or injection. It might be advantageously employed as an internal remedy in dyspepsia, and other debilities of the stomach.

¹ Dissolution d'Acetate de Zinc (F.) Liqueur de l'Acetato di Zinco (I.)

PREPARATIONS OF SULPHUR.

PURE SULPHUR, according to Sir H. Davy's experiments, is a triple compound of oxygen, hydrogen, and a peculiar unknown base. It unites readily with metals, some oxides, earths, and the fixed alkalies, forming compounds which have been denominated *sulphurets*. These are formed by the fusion of the substances in a dry state; and the compounds require to be carefully preserved from the atmosphere, as they attract moisture from it, deliquesce, and are decomposed. When, however, the union of sulphur and alkaline or earthy bases is effected by means of water, the products are not simple *sulphurets*, but sulphurets combined with sulphuretted hydrogen, and have been named *hydrogureted sulphurets*. They are equally susceptible of decomposition by exposure to the air as the sulphurets.

OLEUM SULPHURATUM.¹ Lond. *Sulphurated Oil.*

"Take of washed sulphur, *two ounces*; olive oil, *a pint*. Add the sulphur gradually to the oil heated in a very large iron pot, and stir the mixture after each addition till they have united."

Edinburgh.

"Take of olive oil, *eight parts*; sublimed sulphur, *one part*. Boil them with a gentle heat in a large iron vessel, stirring constantly, until they unite."

Great attention is required in these processes to prevent the mixture from boiling over, or its vapour from catching fire. If either of these accidents occur, the combustion may be stopped by instantly covering the pot with a close lid. The iron pot should be sufficient to contain thrice the bulk of the ingredients.

Qualities.—The odour of this solution of sulphur is extremely foetid, and the taste acrid. It is of a reddish brown colour; has a thick consistence; and when heated emits sulphuretted hydrogen. When it is much concentrated, the sulphur crystallizes in octohedrons.

Medical properties and uses.—Sulphureted oil is stimulant, and externally detergent. It was formerly regarded as balsamic, and recommended in catarrh, asthma, and phthisical affections; but its internal use is now properly exploded. It is sometimes still externally applied for cleansing foul ulcers. The dose was from $\mathfrak{m}$ v. to $\mathfrak{m}$ xxx. taken in water.

POTASSÆ SULPHURETUM. Lond. *Sulphuret of Potash.*²

¹ Balsamum Sulphuris simplex, P. L. 1745. Huile sulphur (F.) Oleo sulfureto (I.)

² Kali Sulphuratum, P. L. 1787. Sulphure de Potasse (F.) Schweflichtes Kali (G.) Solfuro di Potassa (I.)

"Take of washed sulphur, *an ounce*; subcarbonate of potash, *two ounces*. Rub them together, and place the mixture over the fire in a covered crucible until they unite."

SULPHURETUM POTASSÆ. Edin.

"Take of subcarbonate of potash, *two parts*; sublimed sulphur, *one part*. Rub them together, and put them into a large covered crucible, to which, having adapted a cover, apply the fire cautiously, until they melt. Preserve the mass in a well-closed vessel."

SULPHURETUM KALI. Dub. *Sulphuret of Kali.*

"Take of subcarbonate of kali, sublimed sulphur, each *two ounces*. Having mixed them together, put them into a crucible, and having adapted to it a cover, expose it to a fire gradually raised until they unite."

This sulphuret cannot be properly formed by following the directions of any of the Colleges; for, to render the combination complete, it is necessary to expose the subcarbonate in a crucible to a red heat, previously to its being rubbed with the sulphur: the water of the subcarbonate is thus dissipated, and at the same time a portion of the carbonic acid is expelled, both of which, when not driven off, alter the product. When the fusion is effected, the mixture is to be poured upon a marble slab, and, as soon as it concretes, the mass must be broken in pieces and preserved in a closely-stopped bottle.

Qualities.—Well prepared sulphuret of potash is inodorous while dry; but when moistened or dissolved in water, a partial decomposition of both the water and the sulphuret is effected, and it emits the fœtid odour of sulphuretted hydrogen. It has an acrid bitter taste; changes the vegetable blues to green; is hard, brittle, breaking with a glassy fracture, of a liver-brown colour, and stains the skin brown.* By exposure to the air it attracts moisture; its colour changes to a pale green, the fœtid odour noticed above is emitted, and it is gradually converted into hydroguretted sulphuret of potash, combined with a small portion of sulphate of potash. It is also decomposed by all the acids, the sulphur being precipitated; and in a violent heat the sulphur sublimes, leaving the potash.

Medical properties and uses.—Sulphuret of potash is expectorant and diaphoretic. It has been frequently given in chronic asthma and chronic catarrh, without much benefit; but has been found useful in arthritic, rheumatic, and herpetic affections; and in combination with cicuta as a palliative in cancerous cases.² It has also been employed in France, for the cure of scabies, in the form of an ointment made with one part of

¹ Hence its old name, *Hepar Sulphuris*.

² Pearson's *Practical Synopsis*, &c. i. 263.

the sulphuret, 16 of soap, and 32 of oil. From a theory founded on its chemical action on metallic salts out of the body, it has, also, been strongly recommended as an antidote against arsenical, saturnine, and mercurial preparations, when these have been taken in doses sufficient to produce deleterious effects; but it has hitherto been too seldom employed to ascertain its real value in these cases.

The usual dose is grs. iij. or grs. iv. combined with soap, in the form of pills, for the first-mentioned cases; or from grs. v. to grs. x. as an adjunct to cicuta in cancer, given several times a day.

SULPHUR LOTUM. Lond. *Washed Sulphur.*¹

"Take sublimed sulphur, *a pound*. Pour upon it boiling water, that the acid, if there be any, may be entirely washed away; then dry it."

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

"Take of sublimed sulphur, *one part*; water, *four parts*. Boil the sulphur for a short time in the water; then pour off this water, and by repeated affusions of cold water, wash away all the acid: lastly, dry the sulphur."

Dublin.

"Let warm water be poured upon sublimed sulphur, and the washing be repeated as long as the water employed shall appear acid. This is known by means of litmus. Dry the sulphur on bibulous paper."

In subliming sulphur, a small portion of it is apt to be acidified, by attracting the oxygen of the heated air of the vessels, or the chamber in which the process is conducted. The quantity is however very minute, and is completely removed by the above processes; and the sulphur does not afterwards undergo any change from exposure to the air at the ordinary temperature of the atmosphere.

SULPHUR PRÆCIPITATUM. Lond. *Precipitated Sulphur.*²

"Take of sublimed sulphur, *a pound*; fresh burnt lime, *two pounds*; water, *four gallons*. Boil the sulphur and the lime together in water; then filter the liquor through paper, and drop into it as much muriatic acid as may be sufficient to precipitate the sulphur. Finally, wash this with repeated affusions of water, until it becomes tasteless."

In the first part of this process, a hydrogureted sulphuret of

¹ Flores Sulphuris loti, P. L. 1787. Soufre lavé (F.) Schwefel (G.) Zolfo lavato (I.)

² Lac Sulphuris, P. L. 1720. Sulphur precipitatum, P. L. 1787. Soufre précipité (F.) Schwefelniederschlag (G.) Zolfo Precipitato (I.)

lime is produced, by the combination of the lime and sulphur occasioning a decomposition of a part of the water, the hydrogen of which unites with a portion of the sulphur, and forms a hydrosulphuret; while the oxygen with another portion forms sulphuric acid that combines with part of the lime: and thus the solution contains a small portion of sulphate of lime, and a sulphuret of lime combined with sulphureted hydrogen. This hydroguretted sulphuret is then decomposed by the muriatic acid, which unites with the lime, and forms a soluble muriate, while the sulphur is precipitated, and sulphureted hydrogen gas disengaged.

Qualities.—Precipitated sulphur is white, with a very slight greenish tinge. When heated in a retort in a low heat, it acquires the colour of common sulphur, and water is deposited in the beak of the retort; from which circumstance, and the same degree of whiteness being produced when sulphur is sublimed into a vessel filled with steam, there is reason for supposing that precipitated sulphur owes its whiteness to the presence of a little water. It differs in no other respect from sublimed sulphur, and is an unnecessary refinement for the sake of appearance in the composition of ointments.

AQUA SULPHURETI KALI.¹ Dub. *Water of Sulphuret of Kali.*

“Take of sublimed sulphur, *half an ounce*; water of caustic kali, *nine fluid ounces*. Boil them together for ten minutes, and filter through paper. Preserve the preparation in well stopped phials. The specific gravity of this liquor is, to that of distilled water, as 1120 to 1000.”

The name given to this preparation conveys an erroneous idea of its nature. When an alkaline sulphuret is dissolved in water, changes exactly similar to those we have mentioned (*Sulphur præcipitatum*) as taking place during the solution of an earthy sulphuret occur, altering the character of the product; and as the same happen by the direct combination of sulphur with a liquid alkali, this preparation is not a simple aqueous solution of sulphuret of potash, but, in fact, a solution of *hydrogureted sulphuret of potash*, or sulphuret of potash combined with sulphureted hydrogen.²

Qualities.—This solution has a slightly fetid odour, and a nauseous, acrid, bitter taste. Its colour is reddish yellow, approaching to deep orange; its feel soapy; and it stains the cuticle a greenish black. Acids decompose it, precipitating the sulphur, and disengaging a portion of sulphureted hydrogen

¹ Liquore di solfuro di Potassa (I.)

² It was formerly denominated *Liquid Hepar*, or *Liquid Liver of Sulphur*.

gas; and it is also decomposed by exposure to the air, the oxygen of which being absorbed by the sulphur forms sulphuric acid, which produces a sulphate with the potash; so that in process of time the whole is changed into a solution of sulphate of potash. Hence the necessity of preserving it in well stoppered phials.

Medical properties and uses.— This solution does not differ in its medicinal properties from the solid sulphuret of potash. It is, however, chiefly employed as an external application; and as such has been found very beneficial in tinea capitis, scabies, and herpetic eruptions. When given internally, the dose is from mxx. to fʒiss. twice a day.

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

“ Take of water of ammonia, sulphuret of iron, of each *four ounces*; muriatic acid, *eight ounces*; water, *two pounds and a half*. Pour the acid previously mixed with the water, on the sulphuret, and transmit the gas evolved, through the water of ammonia. Preserve the solution in well stoppered phials.”

SULPHURETUM FERRI. Dub. *Sulphuret of Iron.*

“ Take of filings of iron, *six ounces*; sublimed sulphur, *two ounces*. Mix them, 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 fluid ounces*; water, *two pints*; water of caustic ammonia, *four ounces*. Put the sulphuret of iron into a matrass, and gradually pour over it the acid diluted with water; and in a proper apparatus transmit the gas evolved from it through water of ammonia. Toward the conclusion of the operation apply a moderate heat to the matrass.”

The proportions of the ingredients ordered in the Dublin formula for producing the sulphuret of iron enable them to unite at a low heat; and the combination is attended with a brilliant ignition, which takes place without the presence of air. The compound is of a grey colour intermixed with yellow, resembling bronze; has a metallic lustre, and a crystalline texture, with a considerable degree of brittleness, and when pulverized yields a black powder. According to Proust, 100 parts of it consist of 62.5 of iron, and 37.5 of sulphur. The addition of the diluted muriatic acid, by oxidizing the iron, enables it to decompose the water, the hydrogen of which dissolving, part of the sulphur escapes, in the form of sulphuretted hydro-

¹ *Journal de Physique*, liii, 89.

gen gas, which combines at a low temperature with the ammonia of the solution through which it is made to pass. Mr. Cruikshank¹ advises the sulphuret of iron to be prepared "by raising a piece of iron in a smith's forge to a white heat, and then to rub it against the end of a roll of sulphur; the iron, at this temperature, immediately combines with the sulphur, and forms globules of pyrites (*sulphuret*), which should be received into a vessel filled with water; these globules are to be reduced to powder, and introduced into the proof, to which a sufficient quantity of the muriatic acid is to be added." Various other means have been also recommended for the preparation of the sulphuret; but the process directed by the Dublin College is easy and perfectly adequate for the purpose.

Qualities. — Hydro-sulphuret of ammonia is of a dark green colour; has a very foetid odour, and an acrid disagreeable taste. It is decomposed by the acids.

Medical properties and uses. — This preparation is a powerful sedative, lessening the action of the stomach, and of the arterial system in a remarkable degree; and even in moderate doses producing sickness, vomiting, and vertigo. It was first proposed as a remedy by Mr. Cruikshank, with the view of diminishing the morbid appetite and powerful action of the digestive organs, which attend those labouring under diabetes mellitus; and its subsequent use has been confined to the treatment of that disease. The dose to an adult should not at first exceed ℥v. or ℥vj. given in a large tumbler of water, three or four times a day; and the number of drops should be gradually increased, until a slight degree of giddiness takes place, when any further increase must be stopped.

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

"Take of lime recently prepared, muriate of ammonia in powder, each *four ounces*; sublimed sulphur, hot water, of each *two fluid ounces*. Sprinkle the water on the lime, in an earthen vessel, and cover it until the lime fall to powder; mix this when cold by trituration with the sulphur and muriate of ammonia, avoiding the vapours; then put the mixture into a retort, and distil with a strong heat suddenly raised. Preserve the liquor thus obtained in a phial closely stopped with a glass stopper."

In this process the lime decomposes the muriate of ammonia, attracting its acid, and forming a muriate of lime, while the disengaged ammonia unites with the sulphur, one part of which, however, is converted into a hydro-sulphuret, by hydrogen

¹ *Rollo on Diabetes and Lues Venerea.*

arising from partial decomposition of the water, which, combining with the sulphuret of ammonia, thus produces a hydrogureted sulphuret of ammonia. It was formerly known by the name of *Fuming Liquor of Boyle*, having been first prepared by that philosopher.

Qualities. — This liquid is of a deep orange-colour, has a strong ammoniacal fœtid odour, and emits white fumes, owing, as Berthollet ascertained, to an excess of ammonia. The addition of an acid precipitates sulphur, and occasions the disengagement of sulphureted hydrogen gas. It consists of hydro-sulphuret of ammonia holding an excess of sulphur, which it gradually deposits, losing the property of fuming, and is then a nearly pure hydro-sulphuret of ammonia.¹

We are ignorant of any medicinal use to which this preparation has been applied.

VEGETABILIA.

VEGETABLES.

THE collection of vegetables cannot be attended to by the apothecary, and, consequently, the directions necessary for that purpose are of less importance to him than a knowledge of the botanical characters of plants, and the appearances they assume when they are collected under proper circumstances and well dried: for inert plants are often introduced by the collectors among those which possess the most active properties; and from a careless or an improper mode of drying them, the medicinal virtues of the majority of plants are altogether destroyed. When, however, opportunities permit the apothecary to be his own collector, these should not be neglected; and the collection and drying of some plants, particularly foxglove and hemlock, should never be left to the common collector. The following general directions are therefore given in the London Pharmacopœia for collecting vegetable substances.

“VEGETABLES are to be gathered from the soil and situations where they spontaneously grow, in a dry season, and when no dew is upon them: they are to be collected every year, and any which shall have been longer kept are to be thrown away.”

“ROOTS, for the most part, are to be dug up before their stems or leaves shoot forth.” This direction may be followed when the roots are cultivated; but if the prior directions be attended to, it is not easy to conceive by what means the roots

¹ Thomson's Chemistry, 4th edit. iii. 380.

are to be discovered before the stems and leaves are put forth. The object of the order is the obtaining the roots with their active principles in the most concentrated state; and this may be effected by digging them up late in autumn, or early in winter, after the sap is completely detruded to the root, and the stem is withered but yet attached to the root, by which its situation is pointed out. If any change in the composition of the juices takes place during the cessation of vegetation in winter, it is probable that the same will happen, if the root, after being dug up, be preserved in sand.

"BARKS are to be collected at that season in which they are more easily separated from the wood." Spring is the season here alluded to; as at this time, after the sap begins to ascend, the bark is in general very easily separated. But a more important reason may be given for preferring this period, as in spring the active principles deposited in the proper cells of the bark are most abundant: thus, oak bark collected in spring contains four times more tannin than that which is collected in winter.¹

"LEAVES are to be gathered after the flowers have expanded, and before the seeds are mature." These should be in the most perfect state, free from disease, and full grown.

"FLOWERS are to be gathered when just opened." There is, however, one exception to this rule in the red rose, which must be gathered before the buds are expanded.

"SEEDS are to be collected when they are ripe, and before they drop from the plant. They ought to be preserved in their seed vessels."

VEGETABILUM PRÆPARATIO. Lond.

Preparation of Vegetables.

"VEGETABLES soon after they are gathered, except those which are to be used in the recent state, are to be lightly spread out, and dried as quickly as possible with a heat so gentle that their colour will not be altered; and then preserved in proper situations or vessels, where the light and moisture are excluded." When plants cannot be dried immediately on being gathered, they should be revived by immersing their stalks in water for twelve hours. When the leaves are the parts intended to be employed, these are then to be carefully freed from the stalks and laid in thin layers in baskets of willow stripped of its bark, in a drying room kept quite dark. They should then be exposed to a temperature of 140° Fahr. for six or eight hours. When the leaves begin to shrivel they should be turned, and

¹ Vide Biggins's Table, *Phil. Trans.* 1799.

the same temperature continued, until they crumble readily in the hand. When the process has been well conducted the leaves should retain their green colour and their medicinal ¹properties. The vessels best adapted for preserving them are oil jars made perfectly clean and dry; closely covered and kept in a dry warm situation. It is better to preserve those leaves, the virtues of which are particularly connected with their colour, as hemlock and foxglove, in this state, than in the form of powder, a small portion only being occasionally powdered for current use.

“ROOTS, which are required to be preserved fresh, should be buried in dry sand. The SQUILL root (*bulb*), before drying it, is to be denuded of the arid coats, and cut transversely into thin slices.

“PULPY FRUITS, if they be unripe, or ripe and dried, are to be placed in a damp situation, until they become soft: then press out the pulp through a hair sieve; afterwards boil with a gentle heat, frequently stirring; and finally, dissipate the water in a water-bath, until the pulp acquires a proper consistence.

“Over the bruised pods of CASSIA pour boiling water, so as to wash out the pulp, which is to be first pressed through a sieve with large holes, and afterwards through a hair sieve; then dissipate the water in a water-bath until the pulp acquires a proper consistence.

“Press through a sieve the pulp or juice of ripe and fresh fruits, without boiling them.”

VEGETABILIMUM EXSICCATIO. Edin.

The drying of Herbs and Flowers.

“HERBS and flowers are to be dried by the gentle heat of a stove or a common fire, in such a quantity at once as will admit of the operation being very quickly finished: for by this means their powers are better preserved; the indication 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, are, when dried, to be immediately reduced to powder, and preserved in well stopped glass vessels.”

“The root (*bulb*) of the SEA-SQUILL, (*Scilla maritima*) freed from its external coat, is to be cut transversely into thin slices. The indication of its being properly dried, is the retention of

¹ The above is the method adopted by Mr. Battley, of Fore Street, whose attempts to improve Pharmacy deserve the thanks of the profession.

its bitterness and acrimony after it has become friable." The directions of the Dublin College are similar. (See *Pulvis Scillæ* among the Powders.) After the squill has been properly dried, in which operation it loses seven-eighths of its weight, it must be kept in a dry place, as it is apt to retain its moisture in some degree, and become mouldy. It cannot, however, be long preserved in the state of powder without becoming almost inert.

HERBARUM EXSICCATIO. Dub.

The Drying of Herbs.

"PUT the fresh leaves of the herb, gathered when it is in flower, into paper bags, and expose them to a low heat for an hour; then strew them lightly upon a sieve, and dry them as quickly as possible, taking care that their green colour be not injured by too much heat: but if the herbs are to be used under the form of powder, let them be immediately powdered, and the powder preserved in well closed opaque phials.

"Herbs and flowers from which oils and distilled waters are to be obtained, should be dried as soon as they are collected."

PULPARUM EXTRACTIO. Edin.

Extraction of Pulps.

"FRUITS which afford a pulp, if unripe, or if ripe and dry, are to be boiled in a small portion of water till they become soft; then the pulp is to be pressed through a hair sieve, and afterwards boiled in an earthen vessel with a gentle heat, stirring frequently to prevent it from burning, until it acquires the consistence of honey.

"In like manner the pulp of *CASSIA FISTULA* is to be boiled out from the bruised pod, and then brought to a proper consistence by evaporating the water.

"The pulps of recent and ripe fruits are to be pressed through a sieve without being previously boiled."

Dublin.

"If the fruits, the pulps of which are to be extracted, be unripe, or ripe and dry, they are to be boiled in a small portion of water until they become soft; and then the pulps pressed through a hair sieve, are to be reduced by slow evaporation to a proper thickness."

SUCCI SPISSATI. Edin.

Inspissated Juices.

"BEAT the fresh substance and press it strongly through a canvas bag in order to obtain the juice; which being put into

a wide shallow vessel, and heated by means of boiling water saturated with sea salt, is to be reduced to the consistence of honey. The mass when cold, is to be put into glazed earthen vessels, and moistened with strong alcohol."

The juices of fresh vegetables obtained by expression contain, besides the sap of which they chiefly consist, mucilage, fecula, extractive matter, and the other proper juices of the plant. When newly expressed these matters are mixed together, and form a viscid heterogeneous fluid, which gradually separates, by rest, into two parts; the one formed of a deposit of all the insoluble components of the juice generally involved in mucilaginous matter; the other a clear liquor consisting of water holding some mucilage in solution, with the acids and salts, if any, and other soluble principles of the juice. As the clear liquor is that which is wished to be obtained for medical use, it is separated by first decanting it from the deposit, then filtering it repeatedly through a linen cloth, and adding about one-fortieth part of its weight of alcohol; after which it is allowed to remain at rest for some time, and again filtered previous to being put into the bottles in which it is intended to be preserved. The bottles should be kept in a cool cellar, and sunk up to the neck in sand.

Various other methods, also, are employed for depurating vegetable juices; but as these preparations are now almost obsolete, we do not think it necessary to detail them. By whatever means they are prepared, vegetable juices undergo chemical changes, and spontaneous decompositions from keeping, which must necessarily affect their virtues as medicines. They are therefore properly rejected from all the pharmacopœias.

The articles given in the Edinburgh Pharmacopœia under the title *Succi spissati* being associated by the London College with the extracts, and the difference between these preparations being scarcely sufficient to constitute a generic distinction, we have thought it proper not to alter the London arrangement in this respect, and have therefore placed the whole under the title *Extracts*.

GUM RESINS.

GUMMI-RESINÆ. Lond.

"Separate OPIUM very carefully from all extraneous matters, particularly those adhering to its outside. Let it be kept in a soft state fit for forming pills; and in a hard state,

such as can be produced by drying it in the heat of a water-bath, capable of being rubbed into powder.

"Those GUM-RESINS are to be preferred, which can be selected in such a state of purity as to require no purification. If, however, they appear to be less pure, boil them in water until they soften, and express them by a press through a hempen bag: then set them aside, that the resinous part may subside. Pour off the supernatant fluid, and evaporate it by the heat of a water-bath, adding the resinous part towards the end of the operation, and mixing it intimately with the gummy part so as to form one mass.

"Those GUM-RESINS which easily liquefy are to be purified by putting them into an ox bladder, and holding them in boiling water until they become soft enough to be freed from their impurities by pressing them through a hempen bag.

"Dissolve the BALSAM OF STORAX in rectified spirit, and strain it; then distil off the spirit by a gentle heat, until the balsam acquire a proper consistence."

Gum-resins which require to be treated in the above manner are unfit for internal use, and should be kept chiefly for forming plasters and for other external purposes. The degree of heat, although not more than sufficient for the liquefaction of the substances, is nevertheless enough to dissipate many of their odorous and volatile principles, and occasion some changes of composition. The directions for the treatment of opium are sufficient for freeing it from all the grosser impurities; and as the remedy remains unaltered, its strength is preserved unimpaired; whereas when spirit is employed, as was formerly ordered in the London Pharmacopœia, and is still by the Dublin College, it always suffers in efficacy.

OPIUM PURIFICATUM. Dub.¹ *Purified Opium.*

"Take of opium cut into small pieces, *one pound*; proof spirit, *twelve pints*. Digest with a gentle heat and frequent agitation, until the opium be dissolved; then filter the solution through paper, and distil it from a retort to separate the spirits; pour out the residuary liquor, and evaporate it until the extract be of a proper thickness. Purified opium must be kept in two states; one *soft*, proper for forming pills, and one *hard*, capable of being reduced to powder."

STYRAX PURIFICATA. Dub.² *Purified Storax.*

"Digest the storax in tepid water until it softens; then press it in a press between iron plates heated with boiling water; and finally, separate it from the water."

In this process a considerable part of the benzoic acid of the

¹ Opium pur (F.) Mohnsaft (G.) Oppio puro (I.) Opio puro (S.)

² Styra in Körnern (G.) Storace depurato (I.)

storax is dissipated by the heat of the iron plates, and the efficacy of the remedy consequently diminished. Hence the directions of the London College for purifying this substance are to be preferred.

OLEA EXPRESSA.

EXPRESSED OILS.

VEGETABLES yield two distinct species of oil, one of which is volatile at a high temperature, but the other cannot be volatilized without suffering decomposition. The first of these is termed *Volatile Oils*, the second, *Fixed Oils*; a name properly adopted by the Edinburgh College, and more suitable than *Expressed Oils*, the epithet given to this class of substances by the London and the Dublin Colleges.

FIXED OILS are obtained from fruits and seeds either by expression or decoction with water. The dicotyledons or seeds with two seed-lobes yield the greatest portion of oil. When the first process is employed, the fruit or seed is put into a strong hempen or hair bag, and subjected to the press; during the action of which the oil is forced out, generally combined with some other of the vegetable principles, which are afterwards separated by subsidence. The process is facilitated, and the quantity of oil increased, by heating the plates of the press, or previously roasting the seeds; but the oil thus obtained is more liable to become rancid, and hence the cold-drawn oils are always preferred for medicinal purposes. When the oil is to be obtained by decoction, the fruits or seeds are to be bruised previously to being boiled; and the oil which is separated is to be skimmed off from the surface of the water on which it swims.

Fixed oils have different degrees of consistence; they are, 1. Fluid at the ordinary temperature of the atmosphere, congealing in a temperature a little higher than the freezing point of water. 2. Concrete at the ordinary temperature of the atmosphere, and require a higher degree for their liquefaction. The first are denominated *fluid oils*; the second, *vegetable butters*.

1. Fluid fixed oils are generally inodorous and nearly insipid, or have a mild taste. They are transparent, viscid so as to run in streaks upon the sides of glass vessels, and have generally a slight tinge, which may be removed by digestion with charcoal. They are generally lighter than water, but differ

from each other in specific gravity. At about 600° of Fahrenheit they boil, and are then volatilized, but in a state of partial decomposition; the vapour readily catches fire, and burns with a yellow flame. When exposed to the atmosphere at a high natural temperature, such as exists in summer, or in heated rooms, the fixed oils expressed without heat become thick, lose much of their transparency, acquire a sharp taste and a disagreeable odour, and are then said to be rancid; but when heat has been used in their expression, they only become thick, and acquire resinous properties. In both cases the changes are produced by the absorption of oxygen; but in the first case, owing to the combination of the oxygen with some of the vegetable mucilage present in the cold-drawn oil, sebatic acid is formed; and by its diffusion through the oil the change in its properties is produced.

Fixed oils are insoluble in water; but they may be mingled through water, and kept suspended in it by means of mucilage or yolk of egg. They are, with one or two exceptions, nearly insoluble in alcohol and ether; but unite readily with each other, with volatile oils, and with resinous substances. They dissolve sulphur, and form a sort of balsam with it. With the alkalies they combine, and form soaps; but with the acids undergo decomposition: and when boiled with some of the metallic oxides, tough solid compounds or plasters are produced.

2. Concrete fixed oils possess nearly the same properties as the fluid fixed oils. They are, however, more soluble in alcohol and ether, but are not capable of entering so readily into combinations with the alkalies. The ultimate constituents of fixed oil are carbon and hydrogen.

For medicinal purposes these oils are required to be free from rancidity; consequently, they must be preserved in closed vessels, and carefully excluded from the air.

OLEUM AMYGDALARUM. Lond.¹ *Oil of the Almond.*

“Macerate almonds, either bitter or sweet, in cold water, for twelve hours, and bruise them; afterwards express the oil without heat.”

OLEUM AMYGDALI COMMUNIS. Edin. *Oil of the Almond.*

“Take of fresh almonds, and bruise them in a stone mortar, then put them into a hempen sack, and express the oil by a press, without heat.”

OLEUM AMYGDALARUM. Dub. *Oil of Almonds.*

“Bruise fresh almonds in a mortar; and then express the oil by a press, without heat.”

¹ Huile d'Amandes (F.) Mandelnöl (G.) Olio di Mandarleh (I.) Vādomcottay un-nay (Tam.)

The oil obtained from both the sweet and the bitter almond is equally free from bitterness, if heat be not employed. Sixteen ounces of almonds yield about five ounces¹ of a bland inodorous oil, of a very slightly sweetish taste, which is at first a little turbid, but soon becomes clear. Its colour is a very pale greenish yellow, and its specific gravity .932.² The oil from the bitter almond it is said, keeps longer without growing rancid than that from the sweet almond. It is soluble in ether, in the proportion of f̄3x. to f̄3iv. of ether.

Medical properties and uses. — This oil is demulcent and emollient, and is used in coughs and other pulmonary complaints, united with water by means of mucilage or the yolk of egg and sugar. A mixture of f̄3iv. of almond oil, and m̄ viij. of acetate of lead, forms a useful injection at the commencement of gonorrhœa. The dose of the oil is from f̄3iv. to f̄3j.

OLEUM LINI. Lond. Dub. OLEUM LINI USU-
TATISSIMI. Edin. *Oil of Linseed.*³

“Bruise the seeds of common flax, and afterwards express the oil without heat.”

The proportion of oil thus obtained is about 20 per cent. of the seed employed. It is combined with a considerable portion of mucilage⁴, has a strong disagreeable odour, and a nauseous taste; is not congealed except by a cold below 0° of Fahrenheit; and boils at 600° of the same scale. Its colour is a high yellow; and its specific gravity .932.⁵ Four ounces of alcohol are required to dissolve one drachm of it: but the same quantity of ether takes up a fluid ounce and a half.

Medical properties and uses. — Linseed oil is emollient, demulcent, and slightly laxative. On account of its nauseous taste, it is seldom used as an internal remedy, although it has been given with advantage in ileus when purgatives have failed. It is chiefly employed in the form of glyster, in flatulent colic, attended with costiveness, and in abrasions of the rectum; and is an useful application to burns, especially when combined with lime water. The dose, when taken by the mouth, is from f̄3fs. to f̄3j.; but from f̄3vj. may be given at once, per anum.

Official preparation. *Linimentum Aquæ Calcis. E.*

OLEUM RICINI. Lond.⁶ *Castor Oil.*

“Bruise castor seeds, previously decorticated; and express the oil without heat.”

¹ About 3iij more may be obtained by impregnating the marc with the steam of boiling water.

² Fabroni.

³ Huile de graine de lin (F.) Leinöl (G.) Olio di Lino (I.) Azéyte de Laxor (S.)

⁴ The oil usually prepared on a great scale is more free from mucilage, the seeds being roasted before they are subjected to the press.

⁵ Shaw's Boyle, ii. 346.

⁶ Huile de Ricin (F.) Rizinusöl (G.) Olio di Ricino (I.) Sitt. amamāhā unnay (Tam.)

The mode of obtaining this oil, with its qualities and medicinal virtues, have been already noticed. The purer it is, the more soluble it is in alcohol of spec. grav. .820. (See *RICINUS*, *Part ii.*)

OLEA DISTILLATA.

DISTILLED, or VOLATILE OILS.

VOLATILE OILS, as they are properly denominated by the Edinburgh College, are vegetable products, found in almost every part of the vegetable body, except the cotyledons of the seeds, the part in which almost always the fixed oils are contained. In some plants, the volatile oil exists in distinct vesicles, and is obtained by simple expression, but in general it can only be obtained by distillation; whence the name *Distilled Oils*, given to this class of substances by the London College: and as the odour of plants generally depends on their volatile oils, the Dublin College, following the example of the older chemists, who denominated them *Essences*, have adopted the term *Essential Oils*. The expressed volatile oils are now rejected from all the pharmacopœias; and the whole of those used in pharmacy retained, are procured by distillation.

Volatile oil is obtained from both recent and dried plants. When fresh plants are to be employed, they require no previous treatment; but when the plants are dry, or woods or barks are to be employed, the plants must be macerated in water for some time, and the woods and barks be previously rasped. The distillation is performed in the following manner. The plants, or the parts of them containing the oil, are to be put into a tinned copper still, and closely pressed down; after which, as much water is to be poured in as will be sufficient to cover the materials. The head of the still, which should be low, is then to be luted on; the fire lighted, and so regulated as to keep the contents of the still scarcely up to the boiling point; and the distillation continued, until the condensed vapour comes over nearly insipid and inodorous. During this process the volatile oil rises with the watery vapour, from which however, the greater part of it again separates, after it has remained at rest for some hours in a cool place, and either floats on the surface of the water, or sinks to the bottom, according to its specific gravity. The complete separation of the oil is effected by an instrument called a separatory (see *Part i.*);

and the water is to be again used for a second distillation of fresh materials, by which, as it is already impregnated with as much of the oil as it can dissolve, the product of oil of the second, and every subsequent distillation, will be consequently greater than that of the first; but it is not till "the tenth distillation, in some cases, that the produce of the oil attains its maximum."¹ By the same process, volatile oils are obtained from balsams, resins, gum-resins, and turpentine. They have not their characteristic qualities in perfection immediately after their distillation, but have a disagreeable empyreumatic odour; to dissipate which they must be allowed to stand for some days in vessels loosely covered with paper, before they be put into the bottles in which they are to be preserved, which should be opaque.

Although all volatile oils agree in their chemical properties sufficiently to constitute them members of the same class of substances, yet they differ greatly in their qualities from each other, and in the proportions in which they are obtained.

Volatile oils have a penetrating odour, and hot taste. They are completely evaporated when heated in the open air; a property which is taken advantage of as a test of their purity; for if they be adulterated with fixed oil, which is not unfrequently the case, by heating a small portion of the oil on a piece of clean paper, a greasy spot will remain, whereas if the volatile oil be pure, the paper will be left perfectly clean. In a higher temperature, volatile oils are readily ignited, and burn with a bright white flame, emitting a large quantity of black dense smoke; and with the production of a large proportion of carbonic acid and water.

Volatile oils exposed to the light, are changed in colour, or become colourless; when exposed to the air, they become more viscid, less odorous, redden the tincture of turnsole, and gradually assume the form of resins. These changes, Dr. Priestley ascertained², depend upon the absorption of oxygen; and hence the necessity of preserving volatile oils in small phials, completely full, and well corked. An oil which has become thick and scentless, may be rectified by re-distilling it, with some of the same kind of plant from which it was originally extracted, or with alcohol or sulphuric ether³; a limpid odorous oil comes over, and resin remains in the retort.

These oils are very sparingly soluble in water, and render it milky when agitated with it, communicating to it their odour: they are all soluble in alcohol, ether, and the fixed oils in va-

¹ Aikin's Dictionary of Chemistry, Art. Oil.

² Priestley on Air, ii. 232.

³ Nicholson's Journal, 8vo. vii. 68.

rious proportions. From their solubility in alcohol, they are sometimes adulterated with that fluid; but the fraud may be detected by agitating some of the suspected oil with water; when if the oil contain alcohol, an increase of temperature will be indicated by the thermometer, but not if the oil be pure.¹ The more expensive oils are also occasionally adulterated with the cheaper, particularly with oil of turpentine, which however is readily discovered by its peculiar odour, if a piece of paper be dipped in the suspected oil and dried with a gentle heat. They are also sometimes adulterated with castor oil; and as the mixture, when the ingredients are in equal proportions, is soluble in alcohol, the fraud cannot be detected by that test; but it is rendered obvious by the adulterated oil leaving a greasy stain upon paper, which has been touched with it, and held before the fire, whereas no stain is left by the genuine oil.

Volatile oils unite with sulphur, in a temperature sufficient to melt it, and form brown-coloured foetid mixtures, which have been denominated *balsams of sulphur*. The alkalies and earths combine imperfectly with them, and constitute a class of bodies which the French chemists have denominated *sapounes*. The action of the acids is much more violent than on the fixed oils: and several of them detonate when rubbed with oxymuriate of potash.

As medical agents, volatile oils are stimulant and aromatic. They are chiefly employed to remove nausea and flatulence, to correct the griping qualities of some purgatives, and the disagreeable taste of other remedies. They may be given, triturated with water and mucilage; or dropped first on a lump of sugar, and through its medium diffused in water, forming a solution of what has been denominated *oleum saccharum*. The quantity of sugar must be more than ten times the weight of the oil; and when they are well triturated together the oil becomes thus completely soluble in water, and may be diluted to any extent.

Some of the more stimulant of these oils are added to embrocations to be used as rubefacients in cases of numbness, pains, and paralytic affections of the joints.

The three British Colleges give the following general rules for the preparation of *volatile oils*.

¹ Marqueron, *Annales de Chimie*, xlviii. 267.

*OLEA DISTILLATA. Lond.**Distilled Oils.*

"THE seeds of Anise and Carraway, the flowers of Chamomile and Lavender, the berries of Juniper and All-spice, the tops of Rosemary, and the entire plants of the other articles, dried, are to be employed.

"Put any one of these into an alembic, then pour in as much water as will cover it, and distil the oil into a large refrigeratory.

"The water which distils over with the oils of carraway, peppermint, spearmint, all-spice, and penny-royal, is to be preserved for use."

*OLEA VOLATILIA. Edin.**Volatile Oils.*

"As much water only is to be employed as will prevent empyreuma during the distillation. The distillation may be immediately commenced after a proper maceration; and the oil afterwards separated from the water.

"It is also necessary to observe, in preparing these oils and the distilled waters, that the quality of the substances, their texture, the season of the year, and similar circumstances, must occasion so many differences, that it is scarcely possible to give any certain and general rules which shall strictly apply to every example. Many things, therefore, which must be regulated by the judgment of the operator, are omitted, and the more general only given."

*OLEA ESSENTIALIA. Dub.**Essential Oils.*

"LET the oil be extracted by distillation, from the substance previously macerated in water, as much water being added during the distillation as may be sufficient to prevent empyreuma.

"In distilling fennel, peppermint, spearmint, penny-royal, and all-spice, the watery fluid which comes over in distillation with the oil is to be preserved for use according to the directions under the head of Distilled Waters."

Few of the volatile oils are prepared by the apothecary. The oils of anise, chamomile, juniper, organum, rosemary, and pimento are usually imported into this country; while

those of lavender, peppermint, spearmint, and penny-royal, are annually prepared on a large scale.¹

OLEUM ANISI. Lond. OLEUM VOLATILE PIMPINELLE ANISI. Edin. OLEUM SEMINUM ANISI. Dub. *Oil of Anise-seed.*²

This oil is of a whitish or a pale straw-colour, has the odour of the plant, and a slightly pungent, bitter, sweetish taste. It crystallizes at 50° in flat tables. Sixteen pounds of anise-seeds yield about seven ounces of oil.³

Medical properties and uses.— This oil is used chiefly as a carminative; and as it is less pungent than many of the other volatile oils, it is better adapted for relieving flatulence in children. It is given in doses of from $\mathfrak{m}\nu$. to $\mathfrak{m}\chi$. triturated with sugar.

OLEUM ANTHEMIDIS. Lond. OLEUM VOLATILE ANTHEMIDIS NOBILIS. Edin. *Oil of Chamomile.*⁴

The odour of this oil is unpleasant, and the taste pungent. When recently distilled the colour is a caerulean blue, but by exposure to light it changes to yellow. Eighty-two pounds of chamomile flowers yield eighteen drachms of oil.⁵

Medical properties and uses.— This oil is supposed to possess antispasmodic powers, and is therefore sometimes recommended in cramp of the stomach, and as an adjunct to purgative pills. The dose is from $\mathfrak{m}\nu$. to $\mathfrak{m}\chi$. but it is seldom used.

OLEUM CARUI. Lond.⁶ OLEUM SEMINUM CARUI. Dub. *Oil of Carraway.*

Six pounds of carraway-seeds yield four ounces and a half of oil.⁷ It has an aromatic odour, and a sweetish pungent taste; is viscid, and of a yellow colour. Its specific gravity is .946.⁸

Medical properties and uses.— Oil of carraway is stimulant and carminative. It is chiefly used as an adjunct to purgative pills, and to cover the disagreeable flavour of other substances. The dose is from $\mathfrak{m}\mathfrak{j}$. to $\mathfrak{m}\chi$.

OLEUM SEMINUM FENICULI DULCIS.⁹ Dub. *Oil of Fennel Seeds.*

Seventy-five pounds of fennel seeds yield thirty ounces of

¹ Lond. Med. Review, April 1810. 156.

² Huile d'Anis (F.) Anisölhl (G.) Olio di Anice (I.)

³ Baumé.

⁴ Huile de Camomille Romaine (F.) Kamillenölhl (G.) Olio di Camamilla Romana

(I.) Azeyte de Manganella de Botera (S.)

⁵ Baumé.

⁶ Huile de Carvi (F.) Kümmelölhl (G.) Olio di Carvi (I.) Azeyte de Alcorovea (S.)

⁷ Baumé.

⁸ Ibid.

⁹ Huile essentielle de Fenouille (F.) Fenchelölhl (G.) Olio di Fenoichio (I.) Azey de l'Eneldo hinojo (S.)

oil, which is colourless, and congeals at 50°. It has the odour of the plant, and a hot sweetish taste. Its specific gravity is .997.²

Medical properties and uses.—The same as those of the plant. The usual dose is from mij. to mxx. it is rarely used.

OLEUM JUNIPERI. Lond.³ OLEUM VOLATILE JUNIPERI COMMUNIS. Edin. OLEUM BACCARUM JUNIPERI. Dub. *Oil of Juniper.*

Forty-eight pounds of bruised juniper berries yield six ounces of oil⁴, of a specific gravity .611.⁵ Its odour is similar to that of turpentine, and the taste hot and acrid. It has a greenish yellow colour, is viscid, and deposits a fæculent matter when long kept. When genuine it is soluble in alcohol.

Medical properties and uses.—This oil is carminative, diaphoretic, and diuretic. It is sometimes given in dropsy, and may be added to foxglove when it is exhibited in the form of pills. The dose is from mij. to mxx. combined with water by means of sugar or mucilage.

OLEUM LAVANDULÆ. Lond. OLEUM VOLATILE LAVANDULÆ SPICÆ. Edin. OLEUM FLORUM LAVANDULÆ. Dub.⁶ *Oil of Lavender.*

One pound nine ounces of this oil are obtained from eighty pounds of lavender flowers. The odour is very fragrant, and the taste warm and agreeable. Its colour is a very pale lemon yellow, and its specific gravity .936.⁷

Medical properties and uses.—This oil is stimulant and cordial. It is chiefly used in hysteria and nervous headach, in doses of from mij. to m v. given on a lump of sugar.

OLEUM VOLATILE LAURI SASSAFRAS. Edin. OLEUM CORTICIS ET LIGNI SASSAFRAS. Dub. *Oil of Sassafras.*

Sixty pounds of bruised sassafras yield twelve ounces⁸ of a viscid yellow oil, heavier than water, its specific gravity being 1.094.⁹ Its odour is fragrant, and its taste hot and acrid, excoriating the lips when incautiously tasted. The Edinburgh College orders it to be distilled from the bruised root.

Medical properties and uses.—This oil is stimulant, and supposed to be also sudorific and diuretic. It has been given in chronic rheumatism, scurvy, and some cutaneous affections. The dose is from mij. to mxx. but it is scarcely ever ordered.

¹ Dehne.

² Lewis.

³ Huile essentielle de Genevrier (F.) Wachholder beeröhl (G.) Olio di Ginepro (I.)

⁴ Dehne.

⁵ Lewis.

⁶ Huile essentielle de Lavendelöhl (G.) Olio di Lavanda (I.) Azeyte del'Espliego (S.)

⁷ Lewis.

⁸ Baumé.

⁹ Ibid.

OLEUM MENTHÆ PIPERITÆ. Lond. **OLEUM VOLATILE MENTHÆ PIPERITÆ.** Edin. **OLEUM HERBÆ FLORESCENTIS MENTHÆ PIPERITIDIS.** Dub.¹ *Oil of Peppermint.*

Four pounds of the dried plant yield three drachms of this oil.² Its odour is strong, and its taste very pungent, but at the same time impressing a sensation of coldness. Its colour is brownish yellow; but it becomes white when exposed to the light.

Medical properties and uses. — Oil of peppermint is stimulant and carminative. It is a common domestic remedy in cramp of the stomach, flatulent colic, and anorexia; and is usually rubbed up with sugar or mucilage. The dose is from ℥ j. to ℥ iij.

OLEUM MENTHÆ VIRIDIS. Lond. **OLEUM HERBÆ FLORESCENTIS MENTHÆ SATIVÆ.** Dub.³ *Oil of Spearmint.*

This oil has a flavour similar to that of peppermint, but less grateful; its taste is warm and less pungent; its specific gravity .975⁴; and its colour greenish.

Medical properties and uses. — The same as those of oil of peppermint. The dose is from ℥ ij. to ℥ v. given on a lump of sugar.

Official preparation. *Infusum Menthæ compositum.*

OLEUM ORIGANI. Lond. **OLEUM VOLATILE ORIGANI MARJORANÆ.** Edin. **OLEUM HERBÆ FLORESCENTIS ORIGANI.** Dub.⁵ *Oil of common Marjoram.*

One hundred and fifty pounds of dried leaves of common marjoram yield fifteen ounces of oil⁶, of a yellow colour, having the odour of the plant, and a hot acrid taste. Its specific gravity is .940.⁷

Medical properties and uses. — On account of its acrid quality this oil is never exhibited internally. As a local stimulant it is sometimes used to allay the pain of tooth-ach, two or three drops on a piece of cotton being put into the carious tooth.

OLEUM PIMENTÆ. Lond. **OLEUM VOLATILE MYRTI PIMENTÆ.** Edin. **OLEUM BACCARUM PIMENTÆ.** Dub. *Oil of Pimento.*⁸

This oil has the agreeable odour of the pimento, with its pungent taste in an increased degree. It is of a reddish-brown colour, and is heavier than water.

¹ Huile essentielle de Menthe Poivrée (F.) Pfeffermünzöhl (G.) Olio di Menta piperitide (I.)

³ Huile essentielle de Baume verte (F.)

⁴ Lewis.

⁵ Huile essentielle d'origan (F.) Dostbl (G.) Olio di Origano (I.) Azeyte de origane Sylvestre (S.)

⁶ Baume.

⁷ Ibid.

⁸ Huile essentielle de Poivre de Jamaïque (F.) Nelherpfefferöhl (G.) Olio di Pimento (I.)

Medical properties and uses. — It has the same properties as all-spice in a greater degree; and is given in dyspeptic affections, colic, and tympanitis, in doses of from $\mathfrak{m}$ iij. to $\mathfrak{m}$ v. rubbed with sugar, or in any proper vehicle.

OLEUM PULEGII. Lond. **OLEUM HERBÆ FLORESCENTIS PULEGII.** Dub. *Oil of Pennyroyal.*²

This oil is of a reddish-yellow colour, and resembles in its other qualities the oil of peppermint. Its specific gravity is $\cdot 978$.²

Medical properties and uses. — It is stimulant and antispasmodic, but is scarcely ever used. The dose may be from $\mathfrak{m}$ j. to $\mathfrak{m}$ v. given on a lump of sugar.

OLEUM ROSMARINI. Lond. **OLEUM VOLATILE ROSMARINI OFFICINALIS.** Edin. **OLEUM HERBÆ FLORESCENTIS ROSMARINI.** Dub.³ *Oil of Rosemary.*

Twenty-four pounds of the plant yield one ounce of a fluid colourless oil⁴, the odour of which is less agreeable than that of the plant. It deposits crystals of camphor when long kept. Its specific gravity is $\cdot 934$.⁵

Medical properties and uses. — It is stimulant; and frequently enters into the composition of liniments. The dose, as an internal remedy, may be from $\mathfrak{m}$ ij. to $\mathfrak{m}$ vj. but it is scarcely ever ordered.

OLEUM HERBÆ FLORESCENTIS RUTÆ. Dub. *Oil of Rue.*

Twenty-one pounds of Rue yield fifty-nine grains of⁶ oil, which has the strong ungrateful odour and taste of the plant. When recently drawn the colour is yellow, but it deepens to a brown by age, and deposits a brownish resinous sediment. It congeals at 40° Fahrenheit.

Medical properties and uses. — Oil of rue is stimulant and antispasmodic. It is sometimes given in hysteria, and the convulsive affections of infants attendant on dentition; and is sometimes used as a rubefacient in palsy. The dose is from $\mathfrak{m}$ ij. to $\mathfrak{m}$ v. triturated with sugar or mucilage.

OLEUM HERBÆ JUNIPERI SABINÆ. Edin. **OLEUM FOLIORUM SABINÆ.** Dub.⁷ *Oil of Savine.*

Two pounds of savine are said to yield five ounces of⁸ oil. It is limpid, has the odour of the plant, and is extremely

¹ Huile essentielle de Menthe Peuliot (F.) Polciöhl (G.) Olio di Puleggio (I.)
Azeyte de Poleo (S.) ² Lewis.

³ Huile essentielle de Romarin (F.) Rosmarinöhl (G.) Olio di Rosmarino (I.)

⁴ Baumé. ⁵ Lewis. ⁶ Baumé.

⁷ Huile essentielle de Sabine (F.) Sevenbaumöhl (G.) Olio di Sabina (I.) Azeyte
de Enebrio Sabina (S.) ⁸ Murray.

acid to the taste. Its colour is yellow; but it becomes colourless on being kept exposed to light.

Medical properties and uses.—This oil is the principle on which the virtues of savine depend; hence it possesses the same properties, and is applicable to the same purposes as the plant. The dose may be from $\mathfrak{m} \text{ij}$. to $\mathfrak{m} \text{vj}$. triturated with sugar.

ORLEUM CORNU CERVINI RECTIFICATUM.
Dub. *Rectified Oil of Hartshorn.*

“Take of the oil which rises in the distillation of the volatile liquor of hartshorn, *three pounds*; water, *six pints*.

“Distil the oil, then remix it with the water, and redistil, repeating the distillations until the oil become limpid. It ought to be preserved in a dark place, in small phials completely filled, and closely stopped.”

This empyreumatic oil is first formed by the decomposition of animal matter by heat; and arises from a new combination of part of the hydrogen and carbon of the substance distilled. As first obtained it is thick, of a dark colour, and has a very offensive odour; but by the rectification above ordered, it is rendered thinner, and less offensive.

Qualities.—Rectified oil of hartshorn is nearly colourless and transparent; has a strong, slightly aromatic odour, and a penetrating taste. It is very light and volatile, strikes a green colour with syrup of violets; is partially soluble in water, and unites readily with alcohol, ether, and oils. The acids form with it a thick saponaceous compound; and with the alkalies it forms a true soap. Exposure to light and air destroys its transparency, and gives it a deep brown colour.

Medical properties and uses.—This oil is stimulant, antispasmodic, anodyne, and sudorific. It was formerly regarded as a remedy of much efficacy in fever, particularly when given a few hours before the accession of the paroxysm of intermittents; and was also much employed in epilepsy, hysteria, and all convulsive affections. It is now almost discarded from practice, being only occasionally used as an external application to paralytic limbs. The dose may be from $\mathfrak{m} \text{x}$. to $\mathfrak{m} \text{xxx}$. in a sufficient quantity of water.

OLEUM SUCCINI. Lond.¹ *Oil of Amber.*

“Put the amber into an alembic, and distil from a sand-bath, with a fire gradually raised, an acid liquor, the oil, and a salt impregnated with the oil. Then redistil the oil twice.”

OLEUM SUCCINI. Edin. *Oil of Amber.*

¹ Huile de Succin (F.) Bernsteinöl (G.) Olio di Succino Rettificato (I.)

"Take of amber in powder and of pure sand, *equal parts*. Mix them together in a glass retort, the capacity of which the mixture only half fills: and having adapted to it a large receiver, distil in a sand-bath, with a gradually augmented heat. An aqueous fluid tinged with a little yellow oil will first come over; then a yellow oil with an acid salt, and, lastly, a black and reddish oil. Pour the fluid from the receiver and separate the oil from the water."

OLEUM SUCCINI PURISSIMUM. Edin. *Pure Oil of Amber.*

"Distil the oil of amber mixed with six times its quantity of water, from a glass retort until two-thirds of the water pass over into the receiver. Then separate this purified volatile oil from the water, and keep it in well stoppt phials."

OLEUM SUCCINI RECTIFICATUM. Dub. *Rectified Oil of Amber.*

"Take of the oil which comes over in the preparation of succinic acid, *a pound*; water, *six pints*. Distil until two thirds of the water have passed into the receiver: then separate the oil."

The oil of amber, as immediately procured by the distillation of amber, is of a dark colour, a thick consistence, and has a very fetid odour; but by successive distillations it is rendered thinner, of a lighter colour, and at length is obtained nearly limpid.

Qualities. — Rectified oil of amber has a strong ungrateful odour, and a hot acrid taste. It is light, volatile, and inflammable, insoluble in water, and only partially soluble in alcohol.

Medical properties and uses. — Oil of amber is stimulant, antispasmodic, and rubefacient. It has been found serviceable in deficient menstruation, and in hysteria, epilepsy, and some other convulsive affections; but it is now scarcely ever administered as an internal remedy. The dose may be from ℥v. to ℥xij. combined with any distilled water by means of mucilage. It is more generally employed externally as a rubefacient in rheumatism and paralysis; and a mixture of f̄ssj. of this oil with f̄ss of tincture of opium has been found beneficial as a friction to the affected part in tic douloureux; and in hooping-cough, rubbed upon the chest twice or three times a day.

Officinal preparation. *Spiritus Ammoniac succinatus. L.*

OLEUM TEREBINTHINÆ. Dub.¹ *Oil of Turpentine.*

"Take of common turpentine, *five pounds*; water, *four*

¹ Huile essentielle de Térébenthine (F.) Terbenthinöl (G.) Olio di Trementina (I.) Azeyte de Pino (S.)

pints. Distil the oil from a copper alembic. Yellow resin will remain in the retort after the distillation."

OLEUM TEREBINTHINÆ RECTIFICATUM.
Lond. Dub. *Rectified Oil of Turpentine.*

"Take of oil of turpentine, *a pint (two pints, Dub.); water, four pints.* Distil the oil (*a pint and a half of the oil, Dub.*)

OLEUM VOLATILE PINI PURISSIMUM. Edin. *Purified Oil of Turpentine.*

"Take of oil of turpentine, *one part; water, four parts.* Distil as long as any oil passes over."

The chemical qualities and medicinal properties of oil of turpentine have been already noticed. (See PINUS, *Part ii.*) The rectification of it is a troublesome process, and on account of the great inflammability of the vapours, much caution is required to prevent them from escaping through the lutings of the vessels, and catching fire. The rectified oil is a little lighter than the common oil, and completely free from any resinous admixture; but in other respects it has no peculiar excellence to recommend it. What remains in the retort is a thick resinous matter, and is denominated balsam of turpentine.

Medical properties and uses. — As has been already mentioned (*Part ii.*) I have had several opportunities of ascertaining the efficacy of oil of turpentine as a remedy for tape-worm. In every case in which I have administered it, the worm has been expelled, and the symptoms relieved. In general the animal has been voided of a livid hue, and evidently killed; but in one instance, in which a portion of five feet in length was passed after two fluid ounces of the oil had been taken, it was not livid, and when voided, exhibited evident signs of animation. In no instance have we perceived that the large doses of the oil, which were taken for the above purpose, produced any particular effect on the urinary organs. The more usual sensible effects are temporary intoxication, accompanied with considerable nausea, and sometimes vomiting, which, after two or three alvine evacuations, subside, and leave a degree of languor for ten or twelve hours. The pain of the stomach and side, which is an usual concomitant of the disease, is always removed by the oil. I have also given this oil in combination with cinchona, with evident benefit in rheumatism. In some, persons however, it has affected the kidney, producing pain and bloody urine, and in others its administration has produced a severe erythematic eruption over the body. The dose in rheumatism is $\text{f}\text{ʒi}$. repeated every four hours; but in tænia it may be given in doses of $\text{f}\text{ʒj}$. combined with $\text{f}\text{ʒij}$. of syrup of poppies, repeated every six hours until the worm is expelled.

AQUÆ DISTILLATÆ.

DISTILLED WATERS.

It has been already remarked that the volatile oil, on the presence of which the odour and the taste of plants in a considerable degree depend, is elevated during distillation with water; and a portion of it being retained in solution, the water thus acquires the odour and taste of the vegetable with which it is distilled. The qualities, however, thus acquired by water, are scarcely in any case sufficient to give it much power as a remedy; and hence, the distilled waters are generally employed as elegant vehicles only for the exhibition of more active substances.

The following general directions are given by the London College for the preparation of these waters.

“WATERS are to be distilled from dried plants, unless it be otherwise ordered, because fresh plants cannot be procured at all times of the year. When fresh plants are employed, the weight of them ordered is to be doubled.

“To every gallon of these waters add five fluid ounces of proof spirit, to preserve them from spoiling.”

The Edinburgh College orders half an ounce of proof spirit, and the Dublin College half a fluid ounce of rectified spirit, to be added to each pound of the water.

Waters distilled from aromatic plants are more grateful when the plant is used in the dried state; but when delicate odorous flowers or herbs are employed, and the water acquires little more than odour by the distillation, the vegetable should always, if possible, be used in the recent state. Much care is required in conducting the process, to prevent any of the vegetable matter from being scorched, and to stop the distillation before the water is tainted by empyreuma. Notwithstanding, however, every attention that can be given, distilled waters, when newly prepared, have a very disagreeable empyreumatic odour, to dissipate which the vessels holding the waters must be left open to the air as long as any of the unpleasant odour remains; but afterwards it is essential for the preservation of the waters that they be preserved in closely corked vessels.

When long kept, many of the distilled waters undergo a species of decomposition; they become slightly sour, and a ropy

viscid matter forms in them, owing to the essential oil they contain, undergoing decomposition, and changing into mucilage. The addition of the spirit is intended to prevent this from taking place, but it is not adequate to the effect intended; and a much preferable mode is to redistil the waters, after which they will keep good for several years.

Several of these waters are prepared on a great scale, of a superior quality to any that the apothecary can prepare, and cheaper.

AQUA DISTILLATA. Lond.¹ *Distilled Water.*

“Take of water, *ten gallons*. First distil four pints, which are to be rejected, and then distil four gallons. Preserve the distilled water in a glass bottle.”

Edinburgh.

“Let water be distilled in clean vessels, until two thirds of the quantity employed have distilled over.”

Dublin.

“Take of spring water, *twenty pounds*. Put them into a glass retort, and having rejected the first pound which comes over, let one gallon be distilled over with a gentle heat.”

Water is almost universally diffused over the surface of the earth, but it is not found perfectly pure in any place, which is owing to its great solvent powers enabling it to take up a portion of many substances with which it must come into contact in its natural state. These impregnations, however, in spring and in river water, are not sufficient in general to give them any very sensible taste, or render them unfit for the ordinary purposes of life; but for many pharmaceutical purposes it is necessary that the water be absolutely free from every foreign ingredient. *Rain water* is the purest kind of natural water, but it nevertheless contains a portion of carbonic acid gas, and minute quantities of carbonate of lime, and of muriate of lime; in spring water, besides these ingredients, is found a small portion of muriate of soda: *well water*, which is spring water obtained from a greater depth, holds in solution a much larger portion of carbonic acid, and several earthy salts, the principal of which are sulphate and carbonate of lime; and *river water* is impregnated with different proportions of carbonate of lime, sulphate of lime, and muriate of soda. By distillation water is freed from these ingredients, and rendered nearly pure. The process should be conducted slowly, with a moderate degree of heat, and not continued longer than the time specified in the formulæ, otherwise a minute portion of

¹ Eau distillée (F.) Einfaches destillirtes Wasser (G.) Acqua Distillata (L.) Agua destillada (S.)

the saline matter contained in the natural water passes over in the distillation.

Although the necessity of distilled water for many pharmaceutical operations is very obvious, yet, by too much refinement in this particular having been erroneously insisted upon in the former London Pharmacopœia, apothecaries have of late years almost altogether neglected its use, even in cases where it is absolutely necessary. This error the College has avoided in its present Pharmacopœia, and therefore it may be expected that the directions for using it will be strictly attended to. Soft water is a more powerful menstruum of vegetable matter than hard water; and resinous substances cannot easily be mixed with water containing calcareous matter, even when mucilage is used, whereas they readily mix with very soft or distilled water. Perhaps it should be a rule to use filtered rain water only in all pharmaceutical operations in which distilled water is not particularly ordered. In extemporaneous prescriptions distilled water is often ordered, when there is no necessity for its use, and often neglected to be ordered when it is absolutely necessary. It may therefore be useful to know that it is necessary in formulæ containing any of the following substances: *Acidum citricum*, *Antimonium tartarizatum*, *Argentum Nitras*, *Cuprum ammoniatum*, *Ferrum tartarizatum*, *Hydragryi Oxymurias*, *Liquor Ammoniac*, *Liquor Plumbi Acetatis*, *Liquor Potassæ*, *Plumbi Superacetat*, *Solutio Muriatis Barytæ*, *Vinum Ferri*, *Zinci Sulphas*.

AQUA ANETHI. Lond. *Dill Water.*¹

“Take of dill seeds bruised, *a pound*. Pour on them so much water, that during the distillation there may be a sufficiency to prevent empyreuma. Distil one gallon.”

This water has an unpleasant odour and little pungency. It is used principally as a carminative for infants.

AQUA CARUI. Lond. *Carraway Water.*²

“Take of carraway seeds bruised, *a pound*. Pour on them so much water, that during the distillation there may be a sufficiency to prevent empyreuma. Distil a gallon.”

Carraway water possesses a considerable share of the aromatic flavour and pungency of the seeds, and may be used for the same purposes.

AQUA CITRI AURANTII. Edin. *Water of Orange-peel.*³

“Take of fresh orange peel, *two pounds*. Add so much

¹ Eau d'Aneth puant (F.) Acqua di Aneto Puzzolente (I.)

² Eau de Carvi (F.) Feldkümel wasser (G.) Acqua di Carvi (I.)

³ Eau d'Orange (F.) Pomeranzen wasser (G.) Acqua de Arancio (I.)

water that when ten pounds have been drawn off by distillation, there shall remain a quantity sufficient to prevent empyreuma. After due maceration distil ten pounds, to which add five ounces of diluted alcohol."

The water has the flavour only of the orange-peel.

AQUA CITRI MEDICÆ. Edin. *Water of Lemon-peel.*¹

This is prepared in the same manner as the former; ten pounds of water being distilled from two pounds of fresh lemon-peel. It has the flavour of the peel, but is seldom used.

AQUA CINNAMOMI. Lond. Dub. **AQUA LAURI CINNAMOMI.** Edin. *Cinnamon Water.*²

"Take of cinnamon bark bruised, a pound; water, a pint. Macerate the bark in the water for twenty-four hours; then add a sufficient quantity of water to prevent empyreuma during the distillation. Distil a gallon."

This water is milky, and has the agreeable flavour and pungency of the cinnamon; but the oil being ponderous is apt to separate, leaving the water clear and insipid. It is a gentle stimulant and aromatic, but is chiefly used to cover the nauseous taste of other medicines.

AQUA LAURI CASSIÆ. Edin. *Water of Cassia Bark.*³

This is prepared from one pound of bruised cassia bark, in the same manner as the former, for which it is often substituted, being less expensive; but it is also less agreeable.

AQUA FÆNICULI. Lond. **AQUA FÆNICULI DULCIS.** Dub. *Fennel Water.*⁴

"Take of fennel seeds bruised, a pound. Pour over them as much water as will prevent empyreuma during the distillation. Distil a gallon."

AQUA MENTHÆ PIPERITÆ. Lond. Edin. **AQUA MENTHÆ PIPERITIDIS.** Dub. *Peppermint Water.*⁵

"Take of peppermint, a pound and a half, (three pounds, Edin.) Pour over it as much water as will prevent empyreuma during the distillation. Distil a gallon, (ten pounds, Edin.)"

Peppermint water has the flavour and taste of the plant in a considerable degree. It is sometimes used alone as a carminative, but more generally for the purpose of covering the taste of other medicines.

¹ Eau de Citronier (F.) Citronen wasser (G.) Acqua de Limone (I.)

² Eau de Cannelle (F.) Zimmt wasser (G.) Acqua di Cinamomo (I.)

³ Eau de Casse (F.) Acqua di Cannella (I.)

⁴ Eau de Fenouil (F.) Fenchel wasser (G.) Acqua di Finocchio (I.)

⁵ Eau de Menthe poivrée (F.) Pfeffermunz wasser (G.) Acqua di Menta Piperitide (I.)

AQUA MENTHÆ VIRIDIS. Lond. AQUA MENTHÆ SATIVÆ. Dub. *Spearmint Water.*

"Take of spearmint, *a pound and a half*. Distil a gallon of water in the same manner as above."

AQUA PIMENTÆ. Lond. AQUA MYRTI PIMENTÆ. Edin. AQUA PIMENTO. Dub. *Pimenta Water.*¹

"Take of pimento berries bruised, *half a pound*; water, *a pint*. Macerate the berries in the water for twenty-four hours; and with a sufficient quantity of water to prevent empyreuma, distil a gallon, (ten pounds, *Edin.*)"

This water has the odour and aromatic quality of the Jamaica pepper, but is not very agreeable to the taste. It is used as a carminative in dyspepsia.

AQUA PULEGII. Lond. Dub. AQUA MENTHÆ PULEGII. Edin. *Pennyroyal Water.*²

"Take of pennyroyal, *a pound and a half*, (three pounds, *Edin.*) Pour over it a sufficient quantity of water to prevent empyreuma, and distil a gallon, (ten pounds, *Edin.*)"

Pennyroyal water has the flavour and taste of the green herb. It is used for the same purposes as peppermint water.

AQUA ROSÆ. Lond. AQUA ROSÆ CENTIFOLIÆ. Edin. *Rose Water.*³

"Take of the petals of the hundred-leaved rose, *eight pounds*, (six pounds, *Edin.*) Pour over them as much water as will prevent empyreuma during the distillation, Distil a gallon, (ten pounds, *Edin.*)"

AQUA ROSÆ. Dub. *Rose Water.*

"Take of the fresh petals of the damask-rose freed from their claws, *six pounds*; water, *a sufficient quantity* to prevent empyreuma. Distil a gallon."

This water has the agreeable odour of the rose in great perfection when properly prepared; which, however, is seldom the case, except when it is made on a large scale. It is very apt to spoil, unless it be rectified by a second distillation.

As rose water is perfectly free from any acrimony, and, except in point of odour, does not differ from simple distilled water, it is very generally employed in collyria, with acetate and superacetate of lead, and acetate and sulphate of zinc.

¹ Eau de Poivreé de Jamaïque (F.) Nelherpfeffer wasser (G.) Acqua di Pimenti (I.)

² Eau de Menthe peuliot (F.) Poley wasser (G.) Acqua di Puleggio (I.)

³ Eau des Roses (F.) Rosin wasser (G.) Acqua di Rose (I.) Agna rosata (S.)

INFUSA.

INFUSIONS.

THESE are solutions of vegetable matter, obtained by maceration either in cold or boiling water. As in the case of decoction, the substance must be sliced or bruised if in a recent state, or pulverized if dry, in order to expose a large surface to the action of the menstruum. The term *Infusion*, in pharmaceutical language, is confined to watery solutions.

The substances which water, without the aid of boiling, can extract from vegetable matter submitted to its action, are gum, mucus, extractive, tannin, the bitter and narcotic principles, gum-resin, volatile oil, acids, and alkalies, a range which includes most of the principles on which the medicinal properties of plants depend. These principles, also, are less liable to be altered by infusion than by decoction, and, consequently, this form of preparation is to be preferred in every instance to which it is applicable. The strength and quality of the infusions are varied by the degree of temperature of the water: those made with hot water being necessarily stronger, but particularly in the case of bitters; cold infusions are more grateful.

In making infusions, when heat is required, the vessel is to be placed near the fire, so that the temperature of the water may be kept up to the necessary point for a sufficient length of time to produce the effect intended. Perhaps it might be an advantage, were the external surface of infusion pots covered with a metallic coating and polished; by which, as the heat would be much more slowly radiated than from the vessels usually employed, the effect of it would be more uniform and certain in promoting the solvent powers of the water.

Infusions, like decoctions, are liable to undergo spontaneous decomposition, if kept even for a few days; and therefore the London College has properly directed half a pint only to be made at one time, thus regarding them as extemporaneous preparations.

INFUSUM ANTHEMIDIS. Lond. INFUSUM ANTHEMIDIS NOBILIS. Edin. *Infusion of Chamomile.*

“Take of chamomile flowers, *two drachms*; boiling water, *half a pint*. Macerate for ten minutes (twenty-four hours, Edin.) in a highly covered vessel, and strain.”

This infusion is clear, of a pale yellow colour, and has the odour and taste of the flowers. It precipitates solution of isin-

glass, whitish; infusion of yellow cinchona bark, white; solution of sulphate of iron and tincture of muriate of iron, black; solution of nitrate of silver, white; oxymuriate of mercury, pale brown; and acetate and superacetate of lead, yellowish white. These substances, therefore, are incompatible in prescriptions with this infusion.

Medical properties and uses.—It is a good stomachic and tonic; and may be given in dyspepsia and other complaints attended with debility of the stomach, in doses of from f̄ʒj. to f̄ʒij. two or three times a day.

INFUSUM ARMORACIÆ COMPOSITUM. Lond.

Compound Infusion of Horse-radish.

“Take of fresh horse-radish root, sliced, mustard seed, bruised, of each, *an ounce*; boiling water, *a pint*. Macerate for two hours in a lightly covered vessel, and strain; then add of compound spirit of horse-radish, *one fluid ounce*.”

This infusion, after it is strained, deposits by rest a whitish feculent matter, which should be separated. The supernatant clear part is of a sulphur yellow colour, and holds dissolved in every fluid ounce rather more than grs. x. of solid matter. It has a very pungent odour, and a hot biting taste; precipitates infusion of galls yellowish, and infusion of yellow cinchona bark white. The solutions of the pure alkalies do not affect it: but with their carbonates whitish precipitates are produced, as is also the case with solution of oxymuriate of mercury; while nitrate of silver produces one of a brown colour. Hence all those substances, except the pure alkalies, are incompatible in formulæ with this infusion. This infusion soon spoils in hot weather, and emits an offensive odour.

Medical properties and uses.—This is not an unusual form of giving horse-radish, the stimulant property of which is aided by that of the mustard. It is particularly serviceable in paralysis, and in dropsies occurring after intermittents. The dose is from f̄ʒj. to f̄ʒij. given three or four times a day.

INFUSUM AURANTII COMPOSITUM. Lond. *Compound Infusion of Orange-Peel.*

“Take of dried orange-peel, *two drachms*; fresh lemon-peel, *one drachm*; cloves, bruised, *half a drachm*; boiling water, *half a pint*. Macerate for fifteen minutes in a lightly covered vessel, and strain.”

This infusion has the agreeable compound odour and taste of the ingredients from which it is made. It is clear, and has the brown hue of deep-coloured sherry wine. It precipitates sulphate of iron black; and also produces precipitates with superacetate of lead, infusion of yellow cinchona bark, and lime-water.

Medical properties and uses. — It is an excellent and grateful stomachic. The dose may be from fʒj. to fʒiv. given twice or thrice a day.

INFUSUM CALUMBÆ. Lond. INFUSUM COLOMBÆ. Edin. *Infusion of Calumba.*

“Take of calumba root, sliced, *one drachm*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain.”

The active matter of calumba is not all extracted by water. The infusion is inodorous, and tastes bitter. It is clear, and of a pale brown colour: affords precipitates with infusion of yellow cinchona bark, lime-water, and solution of oxymuriate of mercury, which, therefore, ought not to be ordered in conjunction with it. This infusion soon spoils.

Medical properties and uses. — Infusion of calumba is a good stomachic bitter in dyspeptic cases, and for restraining the nausea and severe vomiting which occur in pregnancy. It is also useful in the severe diarrhœa and vomiting which often attend dentition. The dose may be from fʒjss. to fʒiiij. given several times a day.

INFUSUM CARYOPHYLLORUM. Lond. *Infusion of Cloves.*

“Take of bruised cloves, *a drachm*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain.”

This infusion contains all the active matter of the cloves; one fluid ounce holding nearly grs. vj. in solution. It is of a deep clear brown colour, has an aromatic odour, and a bitterish aromatic taste, and affords precipitates with infusion of yellow cinchona bark, the strong acids, and lime-water. Solution of sulphate of iron occasions a copious black precipitate; sulphate of zinc, superacetate of lead, and nitrate of silver, brown precipitates. It also decomposes tartarized antimony.

Medical properties and uses. — It is a warm and grateful stomachic; and may be advantageously used in dyspepsia, particularly when it arises from the abuse of ardent spirits, accompanied with a sensation of coldness at the stomach; in chronic gout, and flatulent colic. The dose is from fʒjss. to fʒij. given three or four times a day.

INFUSUM CASCARIL/Æ. Lond. *Infusion of Cascarella.*

“Take of cascarella bark, bruised, *half an ounce*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain.”

This is a clear, pale reddish brown infusion, having the aromatic odour of the bark, and a bitterish aromatic taste. It is

incompatible in formulæ with the following substances, which it precipitates, lime-water, infusion of galls, infusion of yellow cinchona bark, solutions of nitrate of silver, acetate and superacetate of lead, sulphate of zinc, and sulphate of iron, which is slowly thrown down, of a pale olive colour.

Medical properties and uses.—It is a light stimulant, and tonic; and is advantageously given in some alvine fluxes, particularly such as occur after measles; and in the aphtha gangrenosa of infants. The dose may be from fʒjss. to fʒij.

INFUSUM CATECHU COMPOSITUM. Lond. *Compound Infusion of Catechu.*¹

“Take of extract of catechu, *two drachms and a half*; cinnamon bark, bruised, *half a drachm*; boiling water, *half a pint*. Macerate for an hour in a lightly covered vessel, and strain.”

INFUSUM ACACIÆ CATECHU. Edin. *Infusion of Catechu.*

“Take of pulverized extract of catechu, *two drachms and a half*; cinnamon bark, bruised, *half a drachm*; boiling water, *seven ounces*; simple syrup, *one ounce*. Macerate the extract and bark with the water for two hours, in a covered vessel; then strain, and add the syrup.”

In these formulæ it is intended that the whole of the soluble matter of the catechu taken up by the boiling water should remain dissolved after the infusion cools; but we find that a considerable portion is deposited. When the extract is triturated with water at 212°, as much of it is dissolved as the water can hold in solution, so that a preparation similar to this infusion may be immediately made by simply triturating the materials together. The addition of the syrup ordered by the Edinburgh College prevents the preparation from keeping longer than two or three days, although without the syrup it will keep good for months.

Qualities.—This infusion is inodorous, and has a slightly bitter austere taste, leaving, even when it contains no syrup, an agreeable sweetness in the mouth. The colour when the pale catechu is used, is a light brown or ale colour; but when the dark catechu is employed, a deep red brown. The following substances precipitate its tannin, or otherwise alter its properties, and therefore ought not to be ordered in formulæ with it; solution of isinglass, infusion of yellow cinchona bark, the strong acids, sulphate of iron, sulphate of zinc, oxymuriate of mercury, tartarized antimony, and superacetate of lead. The alkalis only deepen the colour.

Medical properties and uses.—This infusion, which is a pow-

¹ Infusion de Cachou (F.) Katechu infusum (G.) Infuso di Cato (I.)

erful, agreeable astringent, is the best form under which catechu can be prescribed; and is very useful in long-continued diarrhoea, and other fluxes, proceeding from a weakened state of the intestines. The dose is from fʒj. to fʒiij. given after every liquid dejection, or every four hours.

INFUSUM CINCHO'NÆ. Lond. *Infusion of Cinchona Bark.*

“Take of lance-leaved cinchona bark¹, bruised, *half an ounce*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain.”

This infusion contains a very considerable portion of the febrifuge matter of the bark; it is slightly turbid, has a pale pinkish yellow colour, more of the aromatic odour of the bark than the decoction possesses, and an equal degree of bitterness and astringency. It ferments spontaneously in the course of a few days during summer. It affords precipitates with the following substances; the strong acids, the alkaline carbonates, lime-water, solutions of sulphate of iron, sulphate of zinc, nitrate of silver, oxymuriate of mercury, oxide of arsenic, with subcarbonate of potash, and tartarized antimony; the aqueous infusions and decoctions of chamomile flowers, calumba, cascarilla, horse-radish, cloves, catechu, orange-peel, foxglove, senna, rhubarb, valerian, simaruba, and elm bark.

Any considerable portion of the tinctures also produces precipitates in this infusion. Some of these precipitates take place immediately, others not till after several hours have elapsed; the febrifuge virtue is perhaps not always destroyed by them, but the mixtures are certainly rendered inelegant. The sulphuric acid destroys the bitterness of the infusion, but not its astringency.

Medical properties and uses.—The cinchona in this form agrees better with most stomachs than when in powder; but its powers are necessarily diminished. It is chiefly serviceable in dyspepsia, and convalescencies, particularly after the maturation of the pustules in *Ecthyma vulgare*. The dose is from fʒj. to fʒiij. three or four times a day.

INFUSUM CINCHONÆ LANCIFOLIÆ. Edin. *Infusion of Cinchona.* INFUSUM CINCHONÆ SINE CALORE. Dub. *Cold Infusion of Cinchona.*

“Take of cinchona bark, bruised, *one ounce*; water, *one pound* (*twelve ounces by measure*. Dub.) Macerate for twenty-

¹ Infusion de Quinquina (F.) Chinainfusum (G.) Infuso di China (I.)

² The other species of cinchona may be used in the same manner, and proportions.

four hours, agitating frequently, and strain. (Triturate the bark with a little of the water, and whilst triturating, add the remainder; then macerate for twenty-four hours, occasionally agitating, and decant the clear liquor. *Dub.*")

The directions of the Dublin College for making this infusion are preferable to those of the Edinburgh College. It is nearly clear, but deposits by rest a small quantity of a brick red sediment. It is affected by the same substances, and its properties and use are the same as those of the former preparation, from which it differs chiefly in strength. The residuum may be used for some purposes, as its active matter is not nearly exhausted.

INFUSUM CUSPARIÆ. Lond. *Infusion of Cusparia.*

"Take of cusparia bark, bruised, *two drachms*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain."

This infusion is slightly turbid, and of a brownish colour; has a somewhat aromatic odour, and a bitter taste. The solution of sulphate of iron throws down a greenish yellow precipitate, and sulphate of zinc a yellowish one; nitrate of silver, oxymuriate of mercury, superacetate of lead: infusions of galls, and of catechu also, produce precipitates in it. Tartarized antimony is slowly decomposed. These substances, therefore, cannot properly be ordered in formulæ with this infusion.

Medical properties and uses.—This infusion possesses the stimulant and tonic properties of the bark, and is an useful form of giving it in typhoid fevers, obstinate bilious diarrhœa, and in dysentery, after proper evacuations. The tincture of cinnamon both covers its taste, and makes it sit lighter on the stomach. The dose is from fʒj. to fʒiij. given every three or four hours.

INFUSUM DIGITALIS. Lond. *Infusion of Foxglove.**

"Take of dried foxglove leaves, *a drachm*; boiling water, *half a pint*. Macerate for four hours in a lightly covered vessel, and strain; then add of spirit of cinnamon, *half a fluid ounce*."

INFUSUM DIGITALIS PURPUREÆ. Edin. *Infusion of Foxglove.*

"Take of dried foxglove leaves, *one drachm*; boiling water, *eight ounces*; spirit of cinnamon, *one ounce*. Macerate the leaves with the water for four hours, in a lightly covered vessel; then, having added the spirit, strain."

* Infusion de Digitale purpurine (F.) Fingerhut infusum (G.) Infuso di Digitale porporina (I.)

The faint odour and nauseous bitter taste of the foxglove are covered by the spirit of cinnamon in these infusions, which are clear, and of a brownish yellow colour. The solution of sulphate of iron slowly throws down in them a pale olive precipitate; superacetate of lead and infusion or decoction of yellow cinchona produce instantaneous and copious precipitates.

Medical properties and uses. — These infusions do not differ materially from the formula of Withering, and are well calculated to obtain speedily the diuretic effects of the remedy. The dose is from $\text{f}\overline{\text{z}}$ ss. to $\text{f}\overline{\text{z}}$ j. given twice a day; or every eight hours, if the patient be strong, and the symptoms very urgent. For the necessary cautions to be observed in administering them, (See the article *Digitalis*, Part ii.)

INFUSUM GENTIANÆ COMPOSITUM. Lond. *Compound Infusion of Gentian.*

“Take of gentian root, sliced, orange-peel, dried, of each, a drachm; fresh lemon-peel, two drachms; boiling water, twelve fluid ounces. Macerate for an hour in a lightly covered vessel, and strain.”

Edinburgh.

“Take of gentian root, sliced, half an ounce; dried orange-peel, bruised, coriander seeds, bruised, of each a drachm; diluted alcohol, four ounces; water, one pound. First pour on the alcohol, and, after three hours, the water; then macerate without heat for twelve hours, and strain.”

Dublin.

“Take of gentian root, bruised, two drachms; fresh lemon-peel, half an ounce; dried orange-peel, a drachm and a half; proof spirit, four ounces by measure; boiling water, twelve ounces by measure. First, pour on the spirit, and, three hours afterwards, the water; then macerate for the space of two days, and strain.”

The spirit ordered by the Edinburgh and Dublin Colleges, is intended to aid the solvent power of the water, and for preserving the infusion, which in summer very soon becomes ropy, and spoils; but as infusions can always easily be prepared, and boiling water takes up the greater part of the active matter of the ingredients, the spirituous addition, and the length of time ordered for the maceration, are certainly objectionable. The formula of the London College is free from both these objections, and produces a clear infusion, of a yellowish colour, with the agreeable odour of the orange-peel, and a pleasant bitter taste. The solution of superacetate of lead throws down a copious precipitate in this infusion; and sulphate of iron strikes a brown colour, but no precipitate takes place for twelve hours.

Medical properties and uses.—These are very common and elegant tonic and stomachic infusions. They are given in dyspepsia and chlorosis, united with chalybeates, or with alkalies; in atonic gout and diarrhoea, with absorbents and aromatics; in jaundice, with rhubarb and saline purgatives; and in dropsies, with squills and neutral salts. From fʒj. to fʒij. may be given for a dose, three or four times a day.

INFUSUM LINI. Lond. *Infusion of Linseed.*

“Take of linseed, bruised, *an ounce*; liquorice root, sliced, *half an ounce*; boiling water, *two pints*. Macerate for a quarter of an hour, near the fire, in a covered vessel, and strain.”

INFUSUM LINI USITATISSIMI. Edin. *Infusion of Linseed.*

“Take of linseed, *an ounce*; liquorice root, bruised, *two drachms*; boiling water, *two pounds*. Digest for four hours, in a lightly covered vessel, and strain.”

This infusion is a solution of mucus nearly in its pure state. It is clear, colourless, inodorous, and nearly insipid. Alcohol precipitates the mucus in white flocculi; and precipitates are also produced by acetate and superacetate of lead; hence these substances are incompatible in formulæ with this infusion.

Medical properties and uses.—Infusion of linseed is a cheap and very useful demulcent, in the various cases in which this class of remedies is indicated, and during the internal exhibition of corrosive muriate of mercury. The dose is fʒij. frequently repeated.

INFUSUM MENTHÆ COMPOSITUM. Dub. *Compound Infusion of Mint.*

“Take of the leaves of spearmint, dried, *two drachms*; boiling water, *a sufficient quantity to afford six ounces by measure when strained*. Digest for half an hour in a covered vessel, and strain the liquor when cold; then add of refined sugar, *two drachms*, oil of spearmint, *three drops*, dissolved in *half an ounce* (fluid?) of compound tincture of cardamoms. Let them be mixed.”

Medical properties and uses.—This is a grateful stomachic, and is also slightly diaphoretic. It may prove serviceable in anorexia and nausea, and as a vehicle to cover the disagreeable taste of other medicines. The dose may be from fʒj. to fʒijj. or *ad libitum*.

INFUSUM QUASSIÆ. Lond. *Infusion of Quassia.*

“Take of quassia wood, chipped, *a scruple*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain.”

¹ Infusion de Semece de lin (F.) Leinsamen infusion (G.) Infuso di Semi di Lino (I.)

INFUSUM QUASSIÆ EXCELSÆ. Edin. *Infusion of Quassia.*

"Take of quassia wood, rasped, *half a drachm*; boiling water, *eight ounces*. Macerate for two hours in a lightly covered vessel, and strain."

The active matter of quassia taken up by water appears to be a pure, simple bitter. It is not altered by any of the substances usually employed as adjuncts to bitters; and by two only of the metallic salts. Nitrate of silver slowly throws down soft yellow flakes; and superacetate of lead, a white precipitate.

Medical properties and uses.— This infusion is a light tonic, very efficacious in dyspepsia, and other cases in which tonics are indicated. In hysteria it may be combined with purgatives and tincture of valerian; in atonic gout, with aromatics; and in dyspeptic affections with chalybeates, sulphate of zinc, or mineral acids. The dose is from $\text{f}\text{ʒj}$. to $\text{f}\text{ʒiij}$. given twice or thrice a day.

INFUSUM RHEL. Lond. *Infusion of Rhubarb.**

"Take of rhubarb root, sliced, *a drachm*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain."

Edinburgh.

"Take of rhubarb root, bruised, *half an ounce*; boiling water, *eight ounces*; spirit of cinnamon, *one ounce*. Macerate the root with the water in a covered vessel for twelve hours; then add the spirit, and strain."

These infusions differ chiefly in point of strength; and the Edinburgh is rendered pleasanter by the spirituous addition. Neither of them is quite clear; and both have a reddish brown colour, which is very much deepened by the addition of alkalis. The following substances either occasion precipitates in these infusions, or otherwise alter their properties, and are therefore incompatible in formulæ with them: the strong acids, and lime-water, solutions of sulphate of iron, sulphate of zinc, nitrate of silver, oxymuriate of mercury, superacetate of lead, and tartarized antimony; infusions of catechu, cinchona and cusparia.

Medical properties and uses.— These infusions are the best forms in which rhubarb can be given, when intended to act on the bowels. The dose of the former may be from $\text{f}\text{ʒj}$. to $\text{f}\text{ʒiv}$. and of the latter half the quantity, united with neutral salts or aromatics, as circumstances may direct.

INFUSUM ROSÆ. Lond. Dub. *Infusion of Roses.**

"Take of the dried petals of the red rose, *half an ounce*;

* Infusion de Rhubarbe (F.) Rhabarber infusum (G.) Infuso de Rabarbaro (I.)

* Infusion de Roses (F.) Rosen infusum (G.) Infuso di Rose (I.)

boiling water, *two pints and a half* (*three pounds by measure, Dub.*); diluted sulphuric acid, *three fluid drachms* (*three drachms by weight, Dub.*); refined sugar *an ounce and a half*. Pour the water on the rose petals in a covered glass vessel; then drop in the acid, and macerate for half an hour. Finally, strain the liquor, and add the sugar to it."

INFUSUM ROSÆ GALLICÆ. Edin. *Infusion of Red Roses.*

"Take of the dried petals of the red rose, *one ounce*; boiling water, *two pounds and a half*; sulphuric acid diluted, *half an ounce*; refined sugar, *one ounce*. Macerate the petals with the water in an earthen vessel, which has not been glazed with lead, for four hours; then pour in the acid, strain the liquor, and add the sugar."

This infusion is clear, of a beautiful red colour, and has an acid pleasantly austere taste. The addition of the sugar prevents it from being kept so long as it might otherwise be. The incompatible substances are those which are decomposed by the sulphuric acid. The sulphates of iron and of zinc, although they do not immediately alter it, yet slowly produce dark-coloured precipitates after some hours.

Medical properties and uses.— Infusion of roses is indebted for any astringency it possesses chiefly to the acid it contains. It is used alone in the colliquative sweats of phthisis; and as a gargle in cynanche tonsillaris; but it is chiefly employed as an elegant vehicle for more active remedies, particularly sulphate of magnesia, the nauseous taste of which it completely covers. The dose is from fʒij. to fʒiv.

INFUSUM SENNÆ. Lond. *Infusion of Senna.*¹

"Take of senna leaves, *an ounce and a half*; ginger root, sliced, *a drachm*; boiling water, *a pint*. Macerate for an hour in a lightly covered vessel, and strain the liquor."

INFUSUM CASSIÆ SENNÆ. Edin.

"Take of senna leaves, *six drachms*; ginger root, bruised, *a scruple*; boiling water, *nine ounces*. Macerate for an hour in a lightly covered vessel, and strain."

INFUSUM SENNÆ. Dub. *Infusion of Senna.*

"Take of senna leaves, *three drachms*; lesser cardamom seeds, freed from the capsules and bruised, *half a drachm*; boiling water, *as much as will yield, when strained, six ounces by measure*. Digest for an hour, and when the liquor is cold strain it."

These infusions should be clear, and have a deep red brown, nearly black, colour; with a slightly bitter, mawkish taste, which is scarcely corrected by the aromatic. In warm weather they spoil in forty-eight hours; and by simple exposure to

¹ Infusion de Senè (F.) Senna infusion (G.) Infuso di Senna (I.)

the air attract oxygen, which occasions a yellowish precipitate of oxidized extractive, that is not purgative but gripes violently. On this account they should be preserved in a well closed vessel, or made only when wanted. They are also precipitated by the strong acids, the alkaline carbonates, lime-water, solutions of nitrate of silver, oxymuriate of mercury, superacetate of lead, tartarized antimony, and infusion of yellow cinchona bark, which are consequently incompatible in formulæ with these infusions.

Medical properties and uses. — Both these infusions contain all the purgative principles of the plant, whilst the aromatics correct its griping properties: but there is perhaps a waste of senna in the London formula. They are given alone, or more generally combined with neutral salts and manna. The dose of the simple infusions may be from $\text{f}\mathfrak{z}\text{ij.}$ to $\text{f}\mathfrak{z}\text{iv.}$; but with the addition of $\mathfrak{z}\text{j.}$ of the tartrate of potash, or $\mathfrak{z}\text{ij.}$ of the sulphate of magnesia, which are the usual adjuncts, $\text{f}\mathfrak{z}\text{ij.}$ are sufficient.

INFUSUM SENNÆ COMPOSITUM. Edin. *Infusion of Tamarinds and Senna.*

“Take of preserved tamarinds, *one ounce*; senna leaves, *one drachm*; coriander seeds, bruised, *half a drachm*; raw sugar, *half an ounce*; boiling water, *eight ounces*. Macerate in a covered earthen vessel, which is not glazed with lead, shaking frequently, and after four hours strain.

“It may be made also with double or triple the proportion of senna.”

INFUSUM SENNÆ CUM TAMARINDIS. Dub. *Infusion of Senna and Tamarinds.*

Made in the same manner as the infusion of senna, except that $\mathfrak{z}\text{j.}$ of tamarinds is added before straining the liquor.

These infusions are pleasanter than the simple infusions, the nauseous taste being well covered by the sugar and the acid of the tamarinds: in other respects they agree both in their properties, and in the effects of the incompatible substances; to which, however, must be added all salts having potash for their base.

INFUSUM SIMAROUBÆ. Lond. *Infusion of Simaruba.*

“Take of simaruba bark, bruised, *half a drachm*; boiling water, *half a pint*. Macerate for two hours in a lightly covered vessel, and strain.”

This infusion is inodorous; has a slightly bitter taste, is clear, and of a greenish straw colour. The alkaline carbonates and lime water render it milky, and the following substances occasion precipitates: nitrate of silver, oxymuriate of mercury, superacetate of lead; infusions of galls, catechu, and yellow cinchona bark.

Medical properties and uses. — Simaruba infusion possesses the same properties as the bark, and is the best form of exhibiting the remedy, but it is not much used in this country. The dose is fʒij. combined with tincture of opium, or an aromatic.

INFUSUM TABACI. Lond. *Infusion of Tobacco.*

"Take of tobacco leaves, *a drachm*; boiling water, *a pint*. Macerate for an hour in a lightly covered vessel, and strain."

This infusion is clear, of a reddish brown colour; has the odour of the plant in a slight degree, and a hot very acrid taste.

Medical properties and uses. — Tobacco infusion is chiefly intended to be given under the form of enema; for although it has been occasionally employed as an emetic, it cannot be recommended. As an enema it has been found useful in ileus, colica pictonum, incarcerated hernia and dysury; the practice of employing it in cases of suspended animation is now justly condemned.

INFUSUM VALERIANÆ. Dub. *Infusion of Valerian.*

"Take of valerian root, coarsely powdered, *two drachms*; boiling water, *seven ounces by measure*. Digest for an hour, and when the liquor is cold, strain."

Valerian infusion is clear, of a pale brown colour; with the odour of the valerian, and a bitterish pungent taste. Solutions of nitrate of silver, sulphate of iron, and infusion of yellow cinchona, afford precipitates with this infusion; and are therefore incompatible in formulæ with it.

Medical properties and uses. — This is an useful form of giving valerian in hysterical and nervous affections, in which the stomach will not always bear the powder. The dose may be from fʒjss. to fʒij. twice or thrice a day.

AQUA CALCIS COMPOSITA. Dub. *Compound Lime-water.*

"Take of raspings of guaiacum wood, *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 strain."

This is a very inert preparation; and unless great care be taken to exclude the air completely from the vessel in which it is made, the lime-water will be decomposed.

AQUA PICIS LIQUIDÆ. Dub. *Tar Water.*

"Take of tar, *two pints*; water, *a gallon*. Mix, stirring with a wooden rod for a quarter of an hour; then, after the tar shall have subsided, let the liquor be strained, and preserve it in well-corked bottles."

Water readily dissolves a portion of tar; and is impregnated with empyreumatic oil, a small portion of resinous matter, and

acetic acid, the components of the tar. The solution has the colour of Madeira wine, and a sharp empyreumatic taste.

Medical properties and uses. — Tar water is stimulant and diuretic; but to produce the latter effect, its operation requires to be aided by bodily exercise. It may prove useful in scurvy, and some cutaneous diseases; but the reputation which it obtained on the faith of the judgment of the worthy Bishop of Cloyne¹ has long since been lost, and it is now scarcely ever employed. From Oj to Oij may be taken in the course of a day.

MUCILAGINES.

MUCILAGES.

MUCILAGES, correctly speaking, are simple solutions of gum or mucus in water; but the term mucilage, in pharmaceutical language, implies also any solution of a thick and adhesive nature, resembling in its appearance the solutions of gum.

MUCILAGO ACACIÆ.² Lond. *Mucilage of Acacia.*

“Take of acacia gum, in powder, *four ounces*; boiling water, *half a pint*. Rub the gum with the water, gradually added, until it forms a mucilage.”

MUCILAGO ACACIÆ ARABICÆ. Edin. *Mucilage of Gum Arabic.*

“Take of gum arabic, in powder, *one part*; boiling water, *two parts*. Digest with occasional agitation, until the gum be dissolved; then strain the mucilage through linen.”

MUCILAGO GUMMI ARABICI. Dub. *Mucilage of Gum Arabic.*

“Take of gum arabic, in coarse powder, *four ounces*; boiling water, *eight pints*. Digest with frequent agitation, until the gum be dissolved; then strain the mucilage through linen.”

The straining through linen is very necessary, as the gum is often mixed with small pieces of wood and other impurities. The mucilage thus obtained is viscid, thick, and adhesive; semipellucid, and nearly colourless, if the gum be good. It has a faint, peculiar odour, is insipid, and may be kept without altering for a considerable time; but at length it becomes sour, and acetic acid is formed. The strong acids act on it as they do on gum; but when diluted, they do not alter mucilage. Alcohol converts it into a white curd; but proof spirit

¹ Berkley's *Siris*—passim.

² This appellation is certainly exceptionable. It is a mucilage of gum of the *Acacia vera*. The Edinburgh name is liable to nearly the same objection, except that the specific name of the plant is used, whereas *Acacia* is the name of the genus. Mucilage de Gomme arabique (F.) Schlieim de Arabische Gummi (G.) Mucilagine de Gomma arabica (I.)

produces scarcely any alteration; no change is produced by spirit of nitric ether; but sulphuric ether and compound spirit of ether precipitate a thick, white, tenacious curd. Tincture of muriate of iron, even when diluted, converts mucilage into a brownish or orange-coloured, insoluble jelly; and acetate of lead gives a copious, dense, flaky precipitate; while no change is produced by the solutions of the following metallic substances: superacetate of lead, green sulphate of iron, sulphate of zinc, oxymuriate of mercury, and tartarized antimony; nor by the alkalies or neutral salts. Mucilage, like gum, serves to combine resins and oils with water, for which purpose, and to give tenacity to pills, it is much employed in pharmacy.

Medical properties and uses. — The properties of mucilage are the same as those of gum. (See *Part ii.*) It is the usual basis of demulcent mixtures for allaying the tickling which excites cough in catarrh and phthisis; and combined with opium and other narcotics, it is useful in diarrhœa, dysentery, calculous affections, and ardor urinæ. The dose of mucilage may be from fʒss. to fʒj. frequently repeated.

Official preparations. *Mistura Guaiaci. L. Potio Carbonatis Calcis. E.*

MUCILAGO ASTRAGALI TRAGACANTHÆ.
Edin. *Mucilage of Tragacanth.*¹

“Take of gum tragacanth, in powder, *two drachms*; boiling water, *eight ounces*. Macerate for twenty-four hours, and triturate the gum carefully, that it may be dissolved; then strain the mucilage through linen.”

MUCILAGO GUMMI TRAGACANTHÆ. Dub. *Mucilage of Gum Tragacanth.*

“Take of gum tragacanth, in powder, *two drachms*; water, *eight fluid ounces*. Macerate in a covered vessel until the gum be dissolved; then strain the mucilage through linen.”

Tragacanth treated in this manner forms a thick, soft, very viscid mucilage, but the diffusion in the water is not uniform; nor does it become so even when boiled. It may be used in the same cases as mucilage of gum arabic. It has been recommended by M. Blaire, a French surgeon, as a remedy in burns. He directs linen rags, or bibulous paper soaked in the mucilage, to be applied over the affected part, which must be also kept moist with the mucilage for some days.² It is chiefly employed for making pills and troches.

MUCILAGO AMYLI. Lond. Edin. Dub. *Mucilage of Starch.*

¹ Mucilage de gomme Adraganthe (*E.*) Schleim de Traganth (*G.*) Mucilage di gomma Adragante (*I.*)

² Vide *London Med. Repository*, vol. iii. p. 257.

"Take of starch, *three drachms*; water, *a pint*. Rub the starch, gradually adding the water to it; then boil till a mucilage be produced."

Starch thus treated forms a strong, insipid, inodorous, opaline-coloured, gelatinous mucilage. In cases of phthisis, hectic fever, and abrasions of the stomach, it is given as a demulcent by the mouth; but it is more generally, and more advantageously exhibited in the form of enema in diarrhœa, dysentery, and abrasions of the rectum. It is the common vehicle for exhibiting opium in the form of enema.

DECOCTA.

DECOCTIONS.

THESE are aqueous solutions of the active principles of vegetables obtained by boiling. They are intended to afford more powerful remedies than can be obtained by the simple infusion of the same substances in cold or even in boiling water; but although by the operation of boiling the solvent power of the water is increased, and a greater quantity of the soluble parts of any vegetable body is consequently taken up by it, yet it does not always follow, that the medicinal virtues of decoctions are greater than those of infusions. On the contrary, if the active principles of a plant be volatile, or if they consist chiefly of extractive matter, this form of preparation often renders the remedy altogether inert, either by dissipating the volatile matters, or by favouring the oxidizement of the extractive, which in a continued temperature of 212° attracts the oxygen of the atmosphere so rapidly, that it is soon converted into a soluble insipid inert matter, and precipitated in the fluid. This is the case with some substances, which are nevertheless ordered to be prepared in this form by the Colleges, and which we shall particularly notice in treating of the individual decoctions.

For making decoctions, the substances employed must be divided, if in the dry state, by pulverization, or, if fresh, by slicing, so as to expose an extended surface to the action of the water; which is thus enabled to take up their soluble principles in a shorter space of time, a circumstance, for the reasons already stated, of much importance in the preparation of decoctions. By covering the vessel in which they are made, the action of the air is prevented from af-

fecting the ingredients; but there is reason for believing, that by long coction in water, even in covered vessels, the constituents of some vegetable bodies re-act upon each other, and produce entirely new compounds, possessed of properties altogether different from those which they previously constituted. On this account decoctions should be quickly made; and when aromatic or volatile ingredients are to enter into them, these should not be boiled with the more fixed substances, but the decoction, after it is made, should be poured over them, and allowed to remain covered up until it is nearly cold, before it be strained. In general, however, it is better to strain decoctions while they are hot: for as boiling water dissolves a larger proportion of vegetable matter than it can retain in solution at a lower temperature, a deposit almost always takes place as the decoction cools; and if this be of active matter, it is lost by deferring the straining; whereas by straining the decoction while hot, the deposit can be mingled, by being shaken, with the clear fluid, when it enters into extemporaneous compositions, or when the dose of it is taken.

Decoctions, from the nature of their constituents, very soon ferment and spoil; consequently, they should be prepared in small quantities only, and never used, particularly in summer, forty-eight hours after they have been made.

DECOCTUM ALOES COMPOSITUM. Lond. *Compound Decoction of Aloes.*

“Take of extract of liquorice, *half an ounce*; subcarbonate of potash, *two scruples*; extract of spiked aloes, powdered, myrrh, powdered, saffron, of each, *a drachm*; water, *a pint*. Boil down to twelve fluid ounces, and strain; then add of compound tincture of cardamom, *four fluid ounces.*”

By the addition of the alkali in this preparation, the water is enabled to hold in solution a greater portion of the aloes than it could otherwise hold, while another portion is suspended by the mucilage of the liquorice and the myrrh. The addition of the tincture prevents any spontaneous decomposition from taking place. The taste of the decoction is extremely nauseous, notwithstanding the bitter of the aloes is in some degree covered by the liquorice. It is decomposed and a flaky precipitate thrown down in it by all the strong acids; corrosive muriate of mercury produces a pale brown precipitate, while tartarized antimony, sulphate of zinc, and superacetate of lead, produce white curdy precipitates: hence

these substances are incompatible in formulæ with this decoction.

Medical properties and uses. — It is gently cathartic and emmenagogue; and is introduced as being analogous to the well-known *Beaume de Vie*. It may be given with advantage in habitual costiveness, dyspepsia, hypochondriasis, jaundice, and chlorosis, in the dose of from fʒss. to fʒij. taken in the morning.

DECOCTUM ALTHÆÆ OFFICINALIS. Edin. *Decoction of Marsh Mallows.*

“Take of marsh mallow root, dried and bruised, *four ounces*; raisins stoned, *two ounces*; water, *seven pounds*. Boil down to five pounds; set aside the strained liquor until the dregs have subsided, and then decant it.”

Marsh mallow roots contain a considerable quantity of mucus, which is thus extracted unaltered by water. The simple decoction of the roots is viscid, of a pale yellow colour, sweetish, and has a peculiar odour resembling that of boiled turnips. In the above preparation the raisins increase its sweetness, and render it more palatable.

Medical properties and uses. — This decoction is a useful demulcent in visceral inflammations, calculous affections, gonorrhœa, strangury, and other diseases of the urinary organs; and is supposed to be particularly indicated in inflammation of the kidneys after the abscess bursts. The dose is a cupful frequently taken; but in inflammation of the urinary organs, and in similar cases, it may be taken *ad libitum*, as common drink.

DECOCTUM ANTHEMIDIS NOBILIS. Edin. *Decoction of Chamomile.*

“Take of Chamomile flowers, dried, *one ounce*; carraway 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*; fennel seeds, *two drachms*; water, *a pint*. Boil a little, and strain.”

These decoctions contain in solution bitter extractive, and a small portion of essential oil. Were their mode of preparation a matter of any consequence, we would recommend the aromatic seeds not to be added till towards the conclusion of the boiling; but for the purposes of fomentation and glyster, for which they are intended, as much benefit is probably derived from the warm water, as the principles it holds in solution.

DECOCTUM CINCHONÆ. Lond. *Decoction of Cinchona.*¹

"Take of lance-leaved cinchona bark bruised, *an ounce*; water, *a pint*. Boil for ten minutes in a lightly covered vessel, and strain the liquor while it is hot."

DECOCTUM CINCHONÆ LANCEFOLIÆ. Edin. *Decoction of Lance-leaved Cinchona.*

"Take of cinchona bark in powder, *one ounce*; water, *one pound and an half*. Boil for ten minutes in a covered vessel, and strain the liquor while it is hot."

DECOCTUM CORTICIS CINCHONÆ. Dub. *Decoction of Cinchona Bark.*

"Take of cinchona bark in coarse powder, *an ounce*; water, *a pint*. Boil for ten minutes in a vessel almost covered, and strain the liquor through a linen cloth while it is hot."

Cinchona bark is one of those substances which suffers by coction with water; and when the boiling is long continued, its virtues are so much impaired as to be nearly destroyed, owing to the oxidizement of the extractive, which is thus converted into an inert resin, and precipitated. Aware of this effect, the Colleges have properly limited the time of boiling to ten minutes, and ordered the vessel to be covered, and the liquor to be strained while it is hot. As the strained decoction cools, it becomes turbid, and lets fall a reddish or yellowish powder, according to the kind of the bark used: this, however, must not be rejected, but diffused through the clear decoction when it is about to be used in compounding extemporaneous mixtures, or when the dose is to be taken.

This decoction is more bitter but less aromatic than the infusion. It is effected by the same re-agents, and used in the same cases, and in similar doses, as the infusion. (See *Infusum Cinchonæ*.)

DECOCTUM CYDONIÆ.² Lond. *Decoction of Quince Seeds.*

"Take of quince seeds, *two drachms*; water, *a pint*. Boil them over a gentle fire for ten minutes, then strain."

Quince seeds abound with mucus, which is extracted by boiling water. It is considerably viscid, transparent, nearly colourless, insipid, and inodorous. It is coagulated by alcohol, acids, and most of the metallic salts, which, therefore, are incompatible in formulæ with it; and it must be

¹ Decoction de Quinquina (F.) Chinadekokte (G.) Decotto di China (I.)

² This title would lead to the inference that the preparation is a decoction of the quince, and not of the seeds. It should have been *Cydoniæ Seminum*.

used as soon as it is made, for it soon spoils, owing perhaps to its containing some of the other constituents of the seeds.

Medical properties and uses. — This is often preferred to the other mucilages as a local demulcent in tenesmus, and in aphthous affections and excoriations of the mouth. A diluted solution of it injected beneath the eye-lids is useful for ob-
tunding the acrimony of the discharge in violent inflammations of the eye.

DECOCTUM DAPHNES MEZERII. Edin. *Decoction of Mezereon.*¹

“Take of the bark of mezereon root, *two drachms*; liquorice root bruised, *half an ounce*; water, *three pounds*. Boil with a gentle fire down to two pounds, and strain.”

This decoction is slightly mucilaginous, of a yellowish brown colour; has the sweet taste of the liquorice root with a slight degree of bitterness; and leaves in the mouth a sensation of heat and pungency, which, however, is scarcely felt until a few minutes after the dose has been swallowed.

Medical properties and uses. — This decoction was first made public by Dr. Alexander Russel² as an appropriate remedy for venereal nodes, arising from a thickening of the periosteum; and for removing those nocturnal pains with which venereal patients are afflicted. This opinion, however, has not been supported by experience; and Mr. Pearson³ asserts, that it “has not the power of curing the venereal disease in any one stage, or any one form;” and adds, “except in an instance or two of lepra, in which the decoction conferred a temporary benefit, I have very seldom found it possessed of medicinal virtue, either in syphilis, or in the sequelæ of that disease, in scrophula, or in cutaneous affections.” It has been given with seeming benefit in chronic rheumatism. The dose is from f̄₃iv. to f̄₃vi. three or four times a day.

DECOCTUM DIGITALIS. Dub. *Decoction of Foxglove.*

“Take of foxglove leaves dried, *a drachm*; water, *as much as will afford of strained liquor eight fluid ounces*. Place the vessel over a gentle fire, and as soon as the liquor boils remove it; then digest for a quarter of an hour, and strain.”

This decoction is almost inodorous, and has a bitter nauseous taste. It is affected by the same re-agents as the infusion,

¹ Décoction de Daphne mezereon (F.) Scioblbastrinde-dekokte (G.) Decotto di Daphne Mezereon (I.)

² *Medical Observations and Inquiries*, vol. iii.

³ *Pearson on the Remedies for Lues Venerea*, p. 47.

and used in dropsies with the same intention. (See *Infusum digitalis*.)¹

DECOCTUM DULCAMARÆ. Lond. *Decoction of woody Nightshade.*

"Take of the stalks of woody nightshade sliced, *one ounce*; water, *a pint and a half*. Boil down to a pint, and strain."

This decoction appears to have been introduced into the pharmacopœia merely to fix the proportions of the ingredients. It has a strong unpleasant odour, and a bitter nauseous taste followed by a degree of sweetness.

Medical properties and uses.—It is possessed of diuretic and narcotic properties; and has been found useful in humoral asthma, dropsy, lepra vulgaris and alphas, and pityriasis. The dose is from fʒiv. to fʒj. combined with any aromatic tincture, given three times a day.

DECOCTUM GEOFFRÆÆ INERMIS. Edin. *Decoction of Cabbage-tree Bark.*

"Take of cabbage-tree bark in powder, *one ounce*; water, *two pounds*. Boil with a gentle heat down to one pound, and strain."

This decoction has the colour of Madeira wine, a disagreeable odour, and a bitter mucilaginous taste. It is given to children in doses of fʒij. and to adults to the amount of fʒij. An overdose, or drinking cold water during its use, produces vomiting, fever, and delirium; effects which are to be remedied by castor oil, warm water, and acids. It is seldom employed in this country.

DECOCTUM GUAIACI COMPOSITUM. Edin. *Compound Decoction of Guaiacum.*²

"Take of guaiacum wood rasped, *three ounces*; raisins, *two ounces*; sassafras root sliced, liquorice root bruised, of each, *one ounce*; water, *ten pounds*. Boil the guaiacum wood and the raisins in the water over a gentle fire down to five pounds, adding the roots towards the end of the boiling; then strain."

This decoction derives less of its efficacy from the guaiacum than is generally imagined, a small portion of extractive matter only being taken up by the water. It is, however, supposed to be useful in chronic rheumatism, some cutaneous diseases, and in syphilis during a mercurial course; but, probably, at best it is only serviceable as a demulcent. It may be taken in divided doses, to the amount of ʒj. or ʒij. in the day.

¹ For cases of the successful use of this decoction, in making which, however, the fresh leaves were employed instead of the dried, see Darwin's *Zoonomia*, vol. i. p. 326. 331.

² Decoction de Guajac composée (F.) Guajack-dekokte (G.) Decotto di Guajaco composito (I.)

DECOCTUM HORDEI. Lond. Dub. DECOCTUM HORDEI DISTICHI. Edin. *Decoction of Barley.*¹

"Take of pearl barley, *two ounces*; water, *four pints and a half*, (*five pounds*, Edin.) First wash away any extraneous substances that may adhere to the barley; then, having poured on it half a pint of water, boil for a few minutes. This water being thrown away, let the remainder be added boiling; then boil down to two pints, and strain."

DECOCTUM HORDEI COMPOSITUM. Lond. *Compound Decoction of Barley.*

"Take of decoction of barley, *two pints*; figs sliced, *two ounces*; liquorice root sliced and bruised, *half an ounce*; raisins stoned, *two ounces*; water, *a pint*. Boil down to two pints, and strain."

Dublin.

"Take of decoction of barley, *four pints*; raisins stoned, figs sliced, of each, *two ounces*; liquorice root sliced and bruised, *half an ounce*. During the boiling add first the raisins, then the figs, and lastly, the liquorice root a short time before it is finished; when it is completed, the strained liquor ought to measure two pints."

The preparation of these decoctions is generally intrusted to nurses and the attendants of the sick-room; but a practitioner ought not to be ignorant of the best manner of making them, as his directions may be occasionally necessary. They are elegant and useful demulcents in cases of fever, phthisis, gonorrhœa, and strangury; and indeed in all acute diseases, given *ad libitum*. A few drops of tincture of opium may be added to the compound decoction, to obviate its laxative effect, where this might prove hurtful. Equal parts of this decoction, and of decoction of bark, form an excellent gargle in *cy-nauche maligna*.

DECOCTUM LICHENIS.² Lond. DECOCTUM LICHENIS ISLANDICI. Edin. *Decoction of Liverwort.*

"Take of liverwort, *an ounce*; water, *a pint and a half*, (*two pounds*, Edin.) Boil down to a pint, and strain."

DECOCTUM LICHENIS ISLANDICI. Dub. *Decoction of Iceland Liverwort.*

"Take of Iceland liverwort, *half an ounce*; boiling water, *a pint*. Digest for two hours; then boil for a quarter of an hour, and strain the liquor while it is hot."

In these decoctions the bitter principle of the lichen is united

¹ Decoction d'Orge (F.) Gerstedeokotte (G.) Decotto d'Orzo (I.)

² The impropriety of using the generic name only of the plant is here very obvious, particularly as another species of this extensive family, the *Lichen roccella*, is now introduced into the *Duo.* in Pharmacopœia.

with its fecula, which is thus rendered extremely nauseous; and although its operation in the stomach may be thus augmented, yet few patients will be persuaded to take it in this form. The dose is from $\text{f}\text{z}\text{iv}$. to $\text{f}\text{z}\text{ij}$. three times a day. We have already stated its use as a demulcent, when freed from the bitter, and the mode of preparing it. (See *Lichen*, Partii.)

DECOCTUM MALVÆ COMPOSITUM. Lond. *Compound Decoction of Mallows.*

“Take of mallows dried, *an ounce*; chamomile flowers dried, *half an ounce*; water, *a pint*. Boil for a quarter of an hour, and strain.”

This decoction is intended for fomentations and enemas, for which purposes it answers sufficiently well.

DECOCTUM PAPAVERIS. Lond. *Decoction of Poppy.*

“Take of the capsules of the white poppy bruised, *four ounces*; water, *four pints*. Boil for a quarter of an hour, and strain.”

In making this decoction, the seeds should not be rejected, as they contain a considerable portion of bland oil, which, added to the mucilage and narcotic principle of the capsule, increases the emollient quality of the decoction. It is a very useful fomentation in painful swellings, and in the excoriations produced by the thin acrid discharge of ulcers, and those common to infants.

DECOCTUM QUERCUS. Lond. **DECOCTUM QUERCUS ROBORIS.** Edin. *Decoction of Oak Bark.*

“Take of oak bark, *an ounce*; water, *two pints*, (*two pounds and a half*, Edin.) Boil down to a pint, and strain.”

From oak bark thus treated the greater part of its astringent matter is extracted. The decoction is nearly inodorous, has a brown colour, and the austere taste of the bark. It reddens tincture of litmus, and is precipitated by solutions of isinglass, infusion of yellow cinchona bark, the carbonates of the alkalis, the aromatic spirit of ammonia, lime-water, and solutions of sulphate of iron, acetate and superacetate of lead, oxymuriate of mercury, and sulphate of zinc, which are, therefore, incompatible in formulæ with it. The precipitates produced by the two last salts do not take place for a considerable time.

Medical properties and uses.—This is the usual form under which oak bark is exhibited. We have already noticed its internal use. (See *Quercus*, Part ii.) As a local astringent it is used as a gargle in cynanche and relaxation of the uvula; as an injection in passive uterine hæmorrhages, in leucorrhœa,

¹ Decoctum pro enemate, P. L. 1787.

² Decoctum pro fomento, P. L. 1787.

and the gleet discharge which often remains after miscarriages. It is also a useful wash in piles and procedentia recti.

DECOCTUM SARSAPARILLÆ. Lond. *Decoction of Sarsaparilla.*¹

“Take of sarsaparilla root sliced, *four ounces*; boiling water, *four pints*. Macerate for four hours in a vessel lightly covered, and placed near the fire; then take out the sarsaparilla, and bruise it. Return it again to the liquor, and macerate in a similar manner for two hours more; then boil it down to two pints, and strain.”

DECOCTUM SMILACIS SARSAPARILLÆ. Edin. *Decoction of Sarsaparilla.*

“Take of sarsaparilla sliced, *six ounces*; water, *eight pounds*. Digest for two hours in a temperature of about 195°, then take out the root and bruise it; in this state put it again into the liquor, and boil it with a gentle fire down to four pounds; then express it, and strain.”

DECOCTUM SARSAPARILLÆ. Dub. *Decoction of Sarsaparilla.*

“Take of sarsaparilla root sliced, *an ounce and a half*; boiling water, *two pints*. Digest for two hours in a moderate heat; then take out the sarsaparilla, and bruise it; return it to the liquor, and again digest for two hours; then boil down to one half, express, and strain the liquor through a linen cloth.”

We have already stated that the claims which sarsaparilla has to the attention of the practitioner as a remedy in syphilis are very trifling. This decoction may be regarded as little more than a solution of mucus, and a simple demulcent, which may be useful during the exhibition of mercury; and is found to be so in dysuria, and incontinence of urine arising from a morbid irritability of the bladder. It affords precipitates with lime-water, solution of muriate of barytes, and of superacetate of lead, which are therefore incompatible in formulæ with it.

DECOCTUM SARSAPARILLÆ COMPOSITUM. Lond. *Compound Decoction of Sarsaparilla.*

“Take of decoction of sarsaparilla boiling, *four pints*; sassafras root sliced, guaiacum root rasped, liquorice root bruised, of each, *an ounce*; bark of mezereon root, *three drachms*. Boil for a quarter of an hour, and strain.”

Dublin.

“Take of sarsaparilla root sliced and bruised, *one ounce and a half*; raspings of guaiacum wood, bark of sassafras root, liquorice root bruised, of each, *two drachms*; bark of mezereon root, *a drachm*; boiling water, *three pints*. Digest the sarsa-

¹ Decoction de Sarsaparille (F.) Sarsaparille-dekokte (G.) Decotto di Sarsaparilla (I.)

parilla, the guaiacum, and the sassafras, in the water, with a moderate heat for six hours; then boil down to one half, adding towards the end of the coction the liquorice and the mezereon; finally, strain."

This decoction is an imitation of the once celebrated *Lisbon Diet-drink*. Its efficacy depends chiefly on the mezereon root bark, the quantity of which, therefore, ordered by the Dublin College is undoubtedly too small. It operates as a diaphoretic and alterative, and is found to be useful in the treatment of secondary syphilis, chronic rheumatism, and in lepra, and some other cutaneous affections. The dose is from $\text{f}\bar{\text{z}}\text{iv}$. to $\text{f}\bar{\text{z}}\text{vj}$. taken three or four times a day.

DECOCTUM SENEGÆ. Lond. DECOCTUM POLYGALÆ SENEGÆ. Edin. *Decoction of Seneka*.¹

"Take of seneka root, *an ounce*; water, *two pints*. Boil down to a pint, and strain."

This decoction is of a brownish olive colour, inodorous, and has a hot pungent taste. Its virtues have been already discussed under the account of the root. (*Part ii*.) The dose is from $\text{f}\bar{\text{z}}\text{jss}$. to $\text{f}\bar{\text{z}}\text{ij}$. taken three or four times a day.

DECOCTUM ULMI. Lond. Dub. DECOCTUM ULMI CAMPESTRIS. Edin. *Decoction of Elm Bark*.

"Take of fresh elm bark bruised, *four ounces*; water, *four pints*, (*five pints*, Edin.) Boil to two pints, and strain."

This decoction is thick, slightly mucilaginous, and of a brown colour; has a faint odour and a bitterish taste. Alcohol added to it produces a precipitate of light brown flakes; tinctures, therefore, in any considerable quantity, are inadmissible in formulæ with it. Its medicinal properties have been already noticed. (See *Ulmus*, *Part ii*.) The dose is from $\text{f}\bar{\text{z}}\text{iv}$. to $\text{f}\bar{\text{z}}\text{vj}$. taken twice or three times a day.

DECOCTUM VERATRĪ. Lond. *Decoction of White Hellebore*.

"Take of white hellebore root bruised, *an ounce*; water, *two pints*; rectified spirit, *two fluid ounces*. Boil the hellebore root with the water down to a pint, and strain; then, when the decoction is cold, add the spirit."

This decoction is stimulant, acrid, and cathartic; but its operation is too violent for internal use. As a lotion it often proves beneficial in scabies, tinea capitis, and other cutaneous eruptions; but it requires to be used with caution even as an external remedy.

¹ Decoction de Polygale Senega (F.) Senegawurzel-dekokte (G.) Decotto di Poligala Senega (I.)

EXTRACTA.

EXTRACTS.

THESE are preparations obtained by evaporating aqueous and alcoholic solutions of vegetable substances, until a mass of a somewhat firm tenacious consistence remains. When water has been employed for making the solution, the extract may consist of gum or mucilage, extractive, tannin, cinchonin, saccharine matter, and the salts which the vegetable contained, and is termed a *Watery Extract*; but if alcohol has been the menstruum, resin, extractive, and all the above matters, except the gum, may be the ingredients, and the extract is denominated a *Spirituos Extract*. The latter appellation also is used if proof spirit be employed. The proper menstruum, therefore, for the preparation of any extract must be that fluid which most readily dissolves the peculiar principles on which the medicinal efficacy of the vegetable is supposed to depend.

When water is to be employed, the substance to be subjected to its action should be in the dried state, and coarsely powdered; and the solution, whether made by decoction or infusion, should be evaporated immediately after it is strained, and whilst it is yet hot; for, as we observed in treating of Decoctions, water at the temperature of 212° takes up much more of the active matter of vegetables than it can hold in solution at a lower temperature: therefore, by allowing them to cool, with the view of defecation, and evaporating the clear fluid only, a considerable portion of the active matter does not enter into the extract, and is necessarily lost. In performing the evaporation, a higher temperature than that of boiling water must not be employed; but it must, nevertheless, be conducted as quickly as possible; and therefore the evaporating vessel should be broad and shallow, and set in boiling water, or the water-bath recommended by Dr. Powell^{*} should be employed. (See *Instruments*, Part i.)

Alcohol is used only in cases where the active ingredient of the vegetable is chiefly resin, or too volatile to bear the heat which is necessary for evaporating the water without being dissipated, or without suffering some decomposition, which would materially alter its properties. A tincture of the substance is first obtained, which is then evaporated by a very gentle heat

^{*} Translation of the London Pharmacopœia, p. 201.

in a water-bath; but the alcohol need not be allowed to evaporate in the air, as by employing a distilling apparatus, the greater part of it may be again obtained either altogether free from any vegetable principle, or containing a small portion only of the more volatile; which renders it fitter for being again employed for the preparation of the same kind of extract.

Whether water, proof spirit, or pure alcohol be employed, the medicinal properties of the extract are always in some degree injured, the volatile parts are dissipated, and some of the fixed decomposed by the degree of heat required for the evaporation, particularly if water be the menstruum; or the proper extractive is oxidized, and consequently rendered inert. These are strong objections to this form of preparation; and, as Dr. Murray has properly observed, "with the exception of some of the pure bitters, as gentian; or some of the saccharine vegetables, as liquorice; there is no medicine perhaps but what may be given with more advantage under some other form."¹

Extracts require to be kept in a hard and a soft state. A hard extract should be in such a state as to admit of its being easily pulverized, and the soft extract should be such as to retain the round form of a pill, without the addition of any powder. Both kinds should be preserved in a dry place; and the soft should be wrapped in oiled bladder, and kept in covered pots.

The London College does not arrange the extracts under the titles *Watery* and *Spirituos*, which is the arrangement of the Edinburgh College, or *Simple* and *Resinous*, which is that of the Dublin: and the London Pharmacopœia being our text book, we have followed its arrangement. The following general directions are given by the LONDON COLLEGE for the preparation of extracts.

"In preparing all kinds of extracts, evaporate the fluid as quickly as possible in a broad shallow dish placed in a water-bath, until the extract acquires a consistence proper for forming pills, and towards the end of the operation stir assiduously with a spatula.

"Sprinkle a small quantity of rectified spirit upon all the softer extracts."

The EDINBURGH COLLEGE gives its general directions for the preparation of the *Extracts by Water*, under the Extract of Gentian; and for the *Extracts by Water and Alcohol*, under the Extract of Bark.²

¹ *System of Materia Medica*, &c. ii. 119.

² The following method of preparing narcotic extracts, invented by Mr. Battley, Chemist, Fore-Street, London, had been found to answer every purpose in preserving the green colour and the medicinal properties of the plants.

"Plants which from circumstances cannot be operated upon immediately after

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, which is to be reduced by boiling to one half; the liquor is then to be expressed, and after the fæces have subsided, to be filtered, and evaporated by the heat of boiling water, until it begins to thicken; and is to be, finally, inspissated by a medium heat, frequently stirring, until it acquires 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 degree of thickness by means of a stove heated for the 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."

EXTRACTUM CACUMINUM ABSYNTHII. Dub. *Extract of Wormwood.*¹

This is ordered to be prepared according to the above directions. It is nearly a simple bitter, the volatile oil being dissipated during the evaporation. It may be used in those cases for which bitters are commonly prescribed; but it is scarcely ever used. The dose is from gr. x. to ʒj. taken three times a day.

EXTRACTUM ACONITI. Lond. *Extract of Aconite or Wolfsbane.*²

they are collected, must be revived by immersing their stalks in water for twelve or eighteen hours. Such as perfectly recover by this means, which will be known by the leaves becoming as fresh as when growing, are to be bruised and pressed; and the juice from them passed through a fine hair sieve, and immediately placed on the fire. Some time before it is raised to the boiling temperature, a quantity of green-coloured matter begins to float on the surface of the fluid: in the juice of some plants this matter is very considerable: it is to be carefully removed by means of a thin perforated tin dish. By the time the liquor boils, or soon afterwards, the green matter ceases to appear. The boiling is to be continued until rather more than half the fluid has been evaporated, when the decoction is to be put into a conical pan, and suffered to stand in it until cold. A large precipitation of dark green-coloured feculent matter will then be found to have taken place; from which the supernatant fluid is to be poured off, and again exposed to evaporation, until half of it is consumed; when it is to stand for precipitation.

"The precipitated matter from the second coction is by no means so green as the first. The remaining fluid is now to be suffered to boil till it acquires the consistence of syrup; when the matter which had been collected at the commencement by filtration and precipitation is to be mixed with it, and placed in a metallic pan in a water-bath, and further evaporated till of the consistence of an extract. In this latter part of the process, the operator must give his constant attention until it be quite completed. It is not necessary that the matter should be kept constantly stirred; but the operator ought never to suffer it to stick, or become hard on the sides of the pan; for, if it be allowed to harden, the extract loses its green colour; and in proportion to such loss is the deterioration of its medicinal virtues." *London Medical Repository*, vol. iv. p. 198.

¹ Extrait d'Absynthe (F.) Wermuth-extrakt (G.) Estratto d'Assenzo (I.)

² Extrait d'Aconit (F.) Eisenhütlein-extrakt (G.) Estratto d'Aconito Napello (I.)

"Take of fresh leaves of aconite, *a pound*. Bruise them in a stone mortar, sprinkling over them a little water; then express the juice, and, without any depuration, evaporate it to a proper consistence."

SUCCUS SPISSATUS ACONITI NAPELLI. Edin. *Inspissated Juice of Aconite.*

"Let fresh leaves of aconite be bruised; inclose them in a hempen bag and press them strongly, until they yield their juice; which is to be evaporated in flat vessels, heated with boiling water saturated with muriate of soda (*common salt*), and immediately reduced to the consistence of thick honey.

"After the mass is cold, let it be put into glazed earthen vessels, and moistened with alcohol."

This extract, or inspissated juice, is the form under which Stoerk introduced wolfsbane into practice. It has an obscure brownish red colour, a disagreeable odour, and an acrid slightly styptic taste. Its medicinal properties are the same as those of the plant, but it is very seldom used. (See *Part ii.*) The dose at first should be gr. $\frac{1}{2}$ only, and gradually increased to grs. vj. taken night and morning.

EXTRACTUM ALOES PURIFICATUM. Lond. *Extract of Aloes.*¹

"Take of extract of spiked aloes in powder, *half a pound*; boiling water, *four pints*. Macerate for three days in a gentle heat, then strain the solution, and set it aside that the dregs may subside. Pour off the clear liquor, and evaporate it to a proper consistence."

This extract consists chiefly of the mucous and extractive matter of the aloes; but as during the inspissation the extractive is partially oxidized, and rendered less soluble, the extract is not completely soluble in water. It is employed in the same cases as the aloes, and is said to be less stimulant and griping. The dose is from grs. x. to grs. xv. given in the form of pills.

Official preparations. *Pulvis Aloes compositus. L. Pilulæ Aloes compositæ. L. Pilulæ Aloes cum Myrrha. L.*

EXTRACTUM ANTHEMIDIS.² Lond. EXTRACTUM ANTHEMIDIS NOBILIS. Edin. EXTRACTUM FLORUM CHAMÆMELI. Dub. *Extract of Chamomile Flowers.*

"Take of chamomile flowers dried, *a pound*; water, *a gallon*. Boil down to four pints, and strain the liquor while it is hot; then evaporate it to a proper consistence."

The Edinburgh extract is to be prepared in the same manner

¹ Extrait d'Aloes (F.) Aloeextrakt (G.) Estratto d'Aloe (I.)

² Extractum Chamæmeli, P. L. 1787. Extrait de Camomille romaine (F.) Kamillenextrakt (G.) Estratto di fiori di Camomillo (I.)

as the extract of gentian of that college; the Dublin, after the manner directed for the preparation of the simple extracts.

In these processes the volatile oil is dissipated, and a simple bitter extract remains, possessing scarcely any of the properties of the plant. It is of a deep brown colour, and has a grateful bitter taste, but scarcely any odour. It has scarcely any efficacy when used alone; but is a useful adjunct to rhubarb, and sulphate of zinc as a stomachic pill. The dose may be from grs. x. to ℥j. given twice or thrice a day.

EXTRACTUM BELLADONNÆ. Lond. *Succus spissatus Atropæ Belladonnæ.* Edin. *Extract of Belladonna.*¹

“Take of fresh leaves of belladonna, *a pound*. Bruise them in a stone mortar, sprinkling a little water over them; then express the juice, and, without any separation of the sediment, evaporate it to a proper consistence.”

The inspissated juice of the Edinburgh Pharmacopœia is to be prepared in the same manner as the inspissated juice of aconite.

This extract is inodorous, and has a bitterish taste. Its medicinal properties are the same as those of the plant, but weaker. The dose is from gr. j. gradually increased to grs. v. given in the form of pills.

EXTRACTUM CASCARILLÆ RESINOSUM. Dub. *Resinous Extract of Cascarilla.*²

“Take of cascarilla bark in coarse powder, *a pound*; rectified spirit of wine, *four pints*. Digest for four days, then pour off the coloured spirit, and filter. Boil what remains of the cascarilla in ten pints of water down to two pints; then evaporate the strained decoction, and at the same time distil the tincture from a retort, until both begin to thicken; then mix them together, and evaporate the mixture to a consistence proper for making pills. Lastly, mix the extracts intimately together.”

This preparation is expensive, and does not appear to possess any peculiar advantages to recommend it. The dose is from grs. x. to ℥j. given twice or thrice a day, in the form of pills.

EXTRACTUM CINCHONÆ. Lond.³ *Extract of Bark.*

“Take of lance-leaved cinchona bark bruised, *a pound*; water, *a gallon*. Boil down to six pints, and strain the liquor while it is warm. In the same manner boil it down again four successive times, in an equal quantity of water, and strain.

¹ Extrait de Belladonne (F.) Belladonnaextrakt (G.) Estratto de l'erba di Belladonna (I.)

² Extrait de Cascarille (F.) Cascarillenextrakt (G.)

³ Extractum Corticis Peruviani, P. L. 1754. Extrait de Quinquina (F.) Wässriges Chinaextrakt (G.) Estratto di China aquosa (I.)

Finally, mix the solutions together, and evaporate the mixture to a proper consistence.

"This extract ought to be kept in a *soft* state fit for making pills, and in a *hard* state that it may be reduced to powder."

Dublin.

"Take of cinchona bark in coarse powder, *a pound*; water, *six pounds*. Boil for a quarter of an hour in a vessel nearly covered; then filter the decoction while it is yet hot, and set it aside. Boil the residue again in the same quantity of water, and filter it in the same manner: repeat this a third time; and finally, mix all the liquors, and evaporate the mixture to a proper consistence.

"This extract should be kept in two states: one *soft*, fit for making pills; and the other *hard*, or in a state proper to be reduced to powder."

The operation of the same causes as those which we stated to be unfavourable to decoction as a form of preparation for the exhibition of cinchona, are still more hurtful to its efficacy in the form of extract; and, according to Sir John Pringle, the extract is less efficacious, even in equal quantities, than the simple powder. The extract, however, is not devoid of utility, and often sits very lightly on the stomach when the powder is rejected. It is usually ordered in doses of from grs. x. to ʒss. dissolved in any distilled water; but it is necessary to observe, that, owing to the oxidizement of the extractive matter, the solubility of the extract is diminished during its formation: scarcely more than one half is soluble in water. It has a very bitter taste, but is less austere than the bark.

EXTRACTUM CINCHONÆ RESINOSUM. Lond.
*Resinous Extract of Bark.*¹

"Take of lance-leaved cinchona bark, bruised, *a pound*; rectified spirit, *four pints*. Macerate for four days, and strain. Distil the tincture in a water-bath, until the extract has acquired the due consistence."

EXTRACTUM CINCHONÆ LANCIFOLIÆ. Edin. *Extract of officinal Cinchona Bark.*

"Take of lance-leaved cinchona bark in powder, *one pound*; alcohol, *four pounds*. Digest for four days, and pour off the tincture. Boil the residue in five pounds of distilled water for fifteen minutes, and strain the decoction while it is hot through a linen cloth. Repeat this coction and straining with an equal quantity of distilled water, and evaporate the liquor to the consistence of thin honey. Distil the alcohol from the tincture, until it be reduced to a similar consistence. Then mix the

¹ Extrait résineux de Quinquina (F.) Estratto di China colla resina (I.)

inspissated liquors, and evaporate them to a proper consistence in a bath of boiling water, saturated with muriate of soda."

EXTRACTUM CINCHONÆ RUBRÆ RESINOSUM. Dub. *Resinous Extract of Red Cinchona Bark.*

This is ordered to be prepared in the same manner as the resinous extract of cascarilla.

The extract prepared by these processes has the bitter taste and the austereness of the bark, which it nearly equals in efficacy, and is more grateful to the stomach. It is altogether a preferable preparation to the watery extract; for, by the separate action of the spirit and the water, all the soluble and active principles of the drug are taken up: less heat is required to evaporate the menstruum; and, owing to the presence of the alcohol, the extractive matter absorbs less oxygen: indeed, the expence of the spirit, of which there is always some waste, is the only objection to its general use. The dose is from grs. x. to grs. xxx. formed into pills.

EXTRACTUM COLOCYNTHIDIS. Lond. *Extract of Colocynth.*¹

"Take of the pulp of colocynth, *a pound*; water, *a gallon*. Boil down to four pints, and strain the liquor while it is hot; then evaporate it to a proper consistence."

This extract is a milder but less powerful cathartic than the pulp from which it is prepared, and with the addition of calomel forms an excellent purgative pill, which operates without griping. From grs. v. to ʒi. is the usual dose.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM.² Lond. *Compound Extract of Colocynth.*

"Take of colocynth pulp, sliced, *six drachms*; extract of the spiked aloe, powdered, *one ounce and a half*; scammony, powdered, *half an ounce*; cardamom seeds, powdered, *a drachm*; boiling water, *two pints*. Macerate the colocynth pulp in the water with a gentle heat, for four days. Strain the liquor, and add to it the aloes and scammony; then evaporate it to a proper consistence, and towards the end of the inspissation mix in the cardamom seeds."

Dublin.

"Take of the pulp of colocynth, cut small, *six drachms*; hepatic aloes, *an ounce and a half*; scammony, *half an ounce*; lesser cardamom seeds, husked, *a drachm*; Castile soap softened with water, so as to have a gelatinous appearance, *three drachms*; hot water, *a pint*. Digest the colocynth in the water in a covered vessel, with a medium heat, for four days; express and strain the liquor, and add to it the aloes and scammony,

¹ Koloquinthen-extrakt (G.)

² Extractum catharticum, P.L. 1745.

first separately reduced to powder; then evaporate the mixture with a medium heat to a proper consistence for making pills, and towards the end of the inspissation add the gelatinized soap and the powdered seeds, and with frequent stirring mix the whole intimately together."

By this combination of powerful cathartic substances a purgative mass is obtained, more manageable and less irritating than any of its components separately taken. It forms a very useful pill for relieving the habitual costiveness of leucophlegmatic habits; and in obstinate visceral obstructions when combined with calomel, which is not decomposed, as might *à priori* be supposed. The dose is from gr. vj. to ʒss. repeated every eight hours until it operates.

EXTRACTUM CONII. Lond. SUCCUS SPISSATUS CONII MACULATI. Edin. *Extract of Hemlock.*¹

"Take of fresh hemlock, a pound. Bruise it in a stone mortar, sprinkling over it a little water; then express the juice, and without separating the sediment, evaporate it to a proper consistence."

The Edinburgh preparation is to be made according to the directions ordered for the preparation of inspissated juices.

SUCCUS SPISSATUS CICUTÆ. Dub. *Inspissated Juice of Hemlock.*

"Express hemlock leaves, gathered when the flowers are about to appear, and allow the juice to remain six hours to deposit the fæces; then evaporate the pure juice to a proper consistence with a moderate heat."

This extract, or inspissated juice, has a foetid odour, a bitterish saline taste, and a dark olive colour. Although it be the form in which Stoerk introduced hemlock into practice, yet the narcotic power of the remedy is always impaired by this mode of preparation, and it is still more weakened by keeping, being nearly lost when a saline efflorescence begins to appear on the surface of the extract. It is used in the same cases as the powder, with which it is frequently mixed when it is to be made into pills; and is an useful adjunct to mercurials in cutaneous affections. Bergius recommends it in impotency.² The dose is gr. iij. gradually increased to ʒj. given twice or thrice a day.

EXTRACTUM ELATERII. Lond. *Extract of Elaterium.*³

¹ Extrait de Ciqué (F.) Schierlings-extrakt (G.) Estratto del' erba della Cicuta (L.)

² Impotentiam vicilem sub usu Conii curatam observavi, in viro quodam plusquam quadragenario, qui omnem erectionem penis perdiderat, postinde tamen plures liberos procreavit." Bergius, *Mat. Med.* i. 193.

³ Elaterium (F.) Estratto del frutto della Momordica (L.)

" Slice ripe wild cucumbers, express the juice very gently, and pass it through a very fine hair sieve into a glass vessel; then set it aside for some hours, until the thicker part has subsided. Reject the thinner supernatant part, and dry the thicker part with a gentle heat."

ELATERIUM. Dub. *Elaterium.*

" Slice ripe wild cucumbers, and strain the juice very lightly expressed through a fine hair sieve into a glass vessel; then set it aside for some hours until the thicker part subsides; reject the supernatant liquor, and dry the fecula, laid upon a linen cloth and covered with another, by a medium heat."

The substance obtained by these processes is neither an extract nor an inspissated juice, but a peculiar modification of fecula combined with some very active principle which is deposited with it; and therefore the name adopted by the Dublin College is more appropriate than that imposed by the London College. It is very remarkable that the Edinburgh College has rejected so important a remedy from the last edition of its Pharmacopœia.

Medical properties and uses. — Elaterium is a very powerful hydragogue, and excites sickness, severe vomiting, and hypercatharsis, if it be not cautiously administered. On this account it is seldom used as a cathartic; but in ascites it often produces the entire evacuation of the fluid, when gamboge and crystals of tartar, foxglove, and every other remedy have failed. The best mode of administering it is to give it in divided doses of gr. fs. each, every hour, until it begins to operate. It may, however, be given to the extent of gr. iij. for a dose.

EXTRACTUM CACUMINUM GENISTÆ. Dub.
Extract of Broom Tops.

This extract is to be prepared in the same manner as the extract of wormwood. It is said to be diuretic, but its efficacy is doubtful, and it is scarcely ever employed. The dose is from 3fs. to 3j. or more.

EXTRACTUM GENTIANÆ. Lond. EXTRACTUM RADICIS GENTIANÆ. Dub. *Extract of Gentian.*

" Take of gentian root, sliced, a pound; boiling water, a gallon. Macerate for twenty-four hours; then boil down to four pints, strain the liquor while it is hot, and evaporate it to a proper consistence."

EXTRACTUM GENTIANÆ LUTÆ. Edin. *Extract of Gentian.*

" Take of gentian root, any quantity. Having sliced and bruised it, pour upon it eight times its weight of boiling water. Boil down to one half, express the liquor strongly, and strain

¹ Extrait de Gentiane (F.) Enzian-extrakt (G.) Estratto di Gentiana (I.)

it. Evaporate the decoction immediately to the consistence of thick honey, in a bath of boiling water saturated with muriate of soda."

The bitter principle of gentian root is not injured by this form of preparation. The extract is inodorous, very bitter, black, shining, and tenacious. It is chiefly used as a vehicle for the exhibition of the metallic oxides. The dose is from grs. x. to 3fs. given twice or thrice a day.

EXTRACTUM GLYCYRRHIZÆ. Lond. Dub. *Extract of Liquorice.*

"Take of liquorice root sliced, a pound; boiling water, a gallon. Macerate for twenty-four hours; then boil down to four pints; strain the hot solution, and evaporate it to a proper consistence."

There is scarcely any of this extract prepared by the apothecary; the pure extract of liquorice sold in the shops under the name of *refined liquorice* being prepared from the impure extract of commerce, by dissolving it in water, straining, and inspissating it in the usual manner. It is an useful demulcent for allaying tickling cough, as from its tenacity it hangs about and sheathes the fauces.

Official preparations. *Pilulæ opiatæ.* E. *Pilulæ scilliticæ.* E. *Trochisci Glycyrrhizæ glabræ.* E. *Trochisci Glycyrrhizæ cum Opio.* E.

EXTRACTUM HÆMATOXYLI. Lond. **EXTRACTUM HÆMATOXYLI CAMPECHIANI.** Edin. **EXTRACTUM SCOBIS HÆMATOXYLI.** Dub. *Extract of Logwood.*

"Take of logwood rasped, a pound; boiling water, a gallon. Macerate for twenty-four hours; then boil down to four pints; strain the hot liquor, and evaporate to a proper consistence."

This extract is almost inodorous, has a sweet austere taste, and a deep ruby colour. It becomes extremely brittle when kept. It is an useful astringent in the protracted stage of diarrhoea and dysentery. The dose is from grs. x. to 3fs. dissolved in cinnamon water or peppermint water.

EXTRACTUM RADICIS HELLEBORI NIGRI. Edin. Dub. *Extract of Black Hellebore Root.*²

This is to be prepared from the bruised root, after the manner directed for the extract of gentian by the Edinburgh College, and the extract of wormwood by the Dublin College.

EXTRACTUM HUMULI. Lond. *Extract of Hops.*

"Take of the strobiles of the hop, four ounces; water, a gallon. Boil down to four pints; strain the hot liquor; and evaporate it to a proper consistence."

¹ Extractum Ligni Campachensis, P.L. 1745. Campechholz-extrakt (G.)

² Extrait d'Ellebore (F.) Schwarz Niesenwurz-extrakt (G.)

This extract is inodorous; and has the bitter taste peculiar to the hop. We have found it an useful anodyne in gout, acute rheumatism, and cases which do not admit of the use of opium. The dose is from grs. v. to ʒj. given in the form of pills, or dissolved in any aqueous vehicle.

EXTRACTUM HYOSCYAMI. Lond. SUCCUS SPIS-SATUS HYOSCYAMI NIGRI. Edin. SUCCUS SPIS-SATUS HYOS-CYAMI. Dub. *Extract of Henbane.*¹

“Take of fresh leaves of henbane, *a pound*. Bruise them in a stone mortar, sprinkling on them a little water; then press out the juice, and without separating the sediment, evaporate it to a proper consistence.”

This extract has a disagreeable slightly foetid odour, and a nauseous, bitterish, subsaline taste. It is possessed of considerable narcotic powers, and is used as a substitute for opium in nervous affections, mania, gout, rheumatism, and all painful complaints, in which it is wished to avoid the costiveness which opium is apt to induce. A solution of it in water, in the proportion of one drachm to the ounce, dropped into the eye, dilates very much the pupil; and has been used, on the recommendation of Professor Himly, for facilitating the operation for cataract; and also in contracted pupils not accompanied by adhesion of the iris to the capsule.² The dose is from grs. iij. to ʒj. given in the form of pills.

EXTRACTUM JALAPÆ.³ Lond. *Extract of Jalap.*

“Take of jalap root powdered, *a pound*; rectified spirit, *four pints*; water, *ten pints*. Macerate the jalap root in the spirit for four days, and decant the tincture. Boil the residue in the water down to two pints. Then strain separately the tincture and the decoction; distil the former, and evaporate the latter, until both begin to thicken. Lastly, mix the extract with the resin, and evaporate the mixture to a proper consistence.”

“This extract should be kept in a *soft* state fit for forming pills, and in a *hard* state, so that it may be reduced to powder.”

EXTRACTUM CONVULVULÆ JALAPÆ. Edin. *Extract of Jalap.*

This is ordered to be prepared from the root, in the same manner as the extract of cinchona bark. (Edin.)

EXTRACTUM JALAPÆ. Dub. *Extract of Jalap.*

“Let it be prepared in the same manner as the resinous extract of cascarrilla.”

¹ Extrait de Jusquiame (F.) Hyoszyamus-extrakt (G.) Estratta di Giusquiana nera (I.)

² Edin. Medical and Surg. Journal, vol. ix. p. 6. 11.

³ Extractum Jalapii, P. L. 1745. Extrait de Jalap (F.)

These extracts contain all the active principles of the jalap root. They are, however, apt to gripe during their operation: hence, particularly when given to children, they should be triturated with sugar and almonds, or mucilage, so as to form an emulsion, in which state they operate freely and without griping. The dose to an adult is from grs. x. to ʒj.

EXTRACTUM RADICIS JALAPÆ. Dub. *Extract of Jalap Root.*

This is to be prepared with water alone, after the manner directed for the preparation of the simple extracts. (Dub.) It contains chiefly the gummy part of the jalap, very little of the resin being taken up by the water. It is milder in its operation than the root, and may be given to infants in doses of from grs. vi. to grs. xij. triturated with sugar or testaceous powders.

SUCCUS SPISSATUS LACTUCÆ SATIVÆ. Edin. *Inspissated Juice of Garden Lettuce.*¹

This is to be prepared from the fresh leaves, according to the general directions for preparing inspissated juices.

SUCCUS SPISSATUS LACTUCÆ VIROSÆ. Edin. *Inspissated Juice of the Wild Lettuce.*²

To be prepared from the fresh herb, in the same manner as the other inspissated juices.

The extracts of both the above species of lactuca are exhibited as substitutes for opium, in cases in which the intention is rather to allay irritation than to produce the full effect of a narcotic. The dose is grs. vj. gradually increased.

EXTRACTUM OPII. Lond. *Extract of Opium.*³

“Take of opium sliced, *half a pound*; water, *three pints*. Pour a small portion of the water upon the opium, and macerate for twelve hours, that it may become soft; then adding gradually the remaining water, rub them together until they be well mixed, and set the mixture apart that the feculencies may subside. Lastly, strain the liquor, and evaporate it to a proper consistence.”

EXTRACTUM OPII AQUOSUM. Dub. *Watery Extract of Opium.*

“Take of opium, *two ounces*; boiling water, *a pint*. Rub the opium in the water for ten minutes, and after a little pour off the solution; rub the residuary opium in an equal quantity of boiling water for the same space of time, pouring off also this solution; and repeat the operation a third time. Mix together the decanted solutions, and expose the mixture in a

¹ Extrait de Laitue (F.)

² Extrait de Laitue vireuse (F.) Estratto dell' erba della Lactuca (L.)

³ Extrait d'Opium (F.) Opiums ekstrakt (G.) Estratto d'Oppio (L.)

broad open vessel to the air for two days. Lastly, strain it through linen, and by slow evaporation form it into an extract."

Water takes up a certain proportion of all the constituents of crude opium, but less of the resinous than of the gummy part; and from the chemical analysis of opium, it appears that the watery solution contains more of the narcotic principle, or morphia, on which depends the remedial quality of opium. In the Dublin preparation the quantity of active matter must necessarily be greater, owing to the employment of boiling water for the second and third triturations. This extract, therefore, differs very little from opium; but as the inspissation cannot always be conducted exactly in the same manner, its strength must consequently vary. From lbs. of crude opium 3ijss only of extract are obtained, by following the directions of the London College.

Qualities.—This extract is inodorous, has a bitter taste, and is of a very deep brown colour. It is not altogether soluble in water, but is not precipitated from its solution by alcohol. It, however, affords precipitates with the following substances, which ought not, therefore, to enter into prescriptions with its solution; viz. solutions of astringent vegetables, the alkaline carbonates, corrosive muriate of mercury, sulphate of copper, sulphate of zinc, acetate of lead, and nitrate of silver.

Medical properties and uses.—This extract is supposed to possess the narcotic and anodyne powers of opium, but to produce its effects with less subsequent derangement of the nervous system. It is therefore supposed to be well adapted for the diseases of children and very irritable habits. The dose is from gr. j. to grs. vj. for an adult.

Official preparation. *Syrupus Opii*. D.

EXTRACTUM PAPAVERIS. Lond. EXTRACTUM PAPAVERIS SOMNIFERI. Edin. *Extract of Poppies.*¹

"Take of the capsules of the poppy, freed from the seeds, and bruised, *a pound*; boiling water, *a gallon*. Macerate for twenty-four hours; then boil down to four pints; strain the hot liquor, and evaporate it to a proper consistence."

This extract possesses nearly the same medicinal properties as opium, but in a much weaker degree; and is less apt to occasion the nausea, head-ach, and delirium, which opium not unfrequently produces. It is therefore to be preferred for procuring sleep in diseases in which the head is much affected. The dose is from grs. ij. to ʒj. given in the form of pills.

¹ Extrait de Pavot (F.)

EXTRACTUM CORTICIS QUERCUS. Dub. *Extract of Oak Bark.*¹

This extract is ordered to be prepared in the same manner as the simple extracts. It consists principally of tannin, which is, therefore, not liable to be injured by this form of preparation; but it possesses no peculiar advantages to recommend it to particular notice.

EXTRACTUM RHEI. Lond. *Extract of Rhubarb.*²

“Take of rhubarb root bruised, *a pound*; proof spirit, *a pint*; water, *seven pints*. Macerate for four days in a gentle heat; then strain the solution, and set it apart that the feculencies may subside. Pour off the clear liquor, and evaporate it to a proper consistence.”

Although the purgative properties of the rhubarb be obtained to a certain degree in this extract, yet its virtues are certainly impaired during the inspissation; and the simple infusion is in every respect a preferable form of preparation. The dose is from grs. x. to ʒss. given in the form of pills, or dissolved in peppermint water.

EXTRACTUM RUTÆ GRAVEOLENTIS. Edin. EXTRACTUM FOLIORUM RUTÆ. Dub. *Extract of Rue.*

The Edinburgh extract is to be prepared in the same manner as the extract of gentian; the Dublin after the manner of the simple extracts. Prepared by either process, this extract is inodorous, and has a bitter acrid taste. Its medicinal properties are different from those of the plant, the stimulant and narcotic powers of which depend on the volatile oil it contains, which is dissipated during the inspissation of the extract. The dose is from grs. x. to ʒj. in pills.

EXTRACTUM FOLIORUM SABINÆ. Dub. *Extract of Savine.*

To be prepared in the same manner as the simple extracts. It is a simple bitter of little efficacy, for the acrid volatile oil on which the efficacy of savine depends is dissipated by the heat employed during the inspissation. The dose is from grs. x. to ʒss. in pills.

SUCCUS SPISSATUS SAMBUCI NIGRÆ. Edin. *The inspissated Juice of the Black Elder.*³

“Take of the ripe berries of the black elder, *five parts*; purified sugar, *one part*. Boil with a gentle heat to the consistence of thick honey.

EXTRACTUM SARSAPARILLÆ. Lond. *Extract of Sarsaparilla.*

¹ Estratto della Quercia (I.) ² Extrait de Rhubarbe (F.) Rhabarber-extrakt (G.)

³ Eingedickter Fliedersaft (G.)

“Take of sarsaparilla root, sliced, *a pound*; boiling water, *a gallon*. Macerate for twenty-four hours, then boil down to four pints; strain the solution while it is hot, and evaporate it to a proper consistence.”

This extract has nothing to recommend it to practice. The decoction of the root is preferable in every respect, but neither of them is possessed of much efficacy. The dose is from grs. ix. to ʒj. dissolved in the decoction, or given in the form of pills.

EXTRACTUM TARAXACI. Lond. EXTRACTUM HERBÆ ET RADICIS TARAXACI. Dub. *Extract of Dandelion.*¹

“Take of fresh dandelion root, bruised, *a pound*; boiling water, *a gallon*. Macerate for twenty-four hours; then boil down to four pints, strain the hot liquor, and evaporate it to a proper consistence.”

The medicinal powers of dandelion have been already noticed. (See *Part ii.*) This extract is supposed to contain all the active principles of the plant, and to prove equally efficacious in hepatic obstructions. Dr. Pemberton affirms, that he has seen great advantage result from its administration in doses of ʒiss. in chronic inflammation and incipient scirrhus of the liver, and in chronic derangement of the stomach.² The usual dose is from grs. x. to ʒj. united with sulphate of potash.

EXTRACTUM VALERIANÆ. Dub. *Extract of Valerian.*³

“Take of valerian root in coarse powder, *six ounces*; boiling water, *six pints*. Mix and digest for twenty-four hours with a moderate heat in a covered vessel; then express the liquor, and reduce it by evaporation to a proper consistence.”

The odour of the plant is almost entirely dissipated in preparing this extract; and if the efficacy of the remedy be connected with that quality, which is extremely probable, it must be much inferior to the infusion, or tincture. The usual dose is from grs. x. to ʒj. given in the form of pills, or dissolved in some distilled water.

MISTURÆ.

MIXTURES.

THE term Mixture in pharmaceutical language denotes a mingled compound, in which different ingredients are held suspended in a fluid medium by means of mucilaginous or saccharine matter. The London College has placed under this

¹ Löwenzahn-extrakt (G.) Estratto di Tarassaco (I.)

² On Diseases of the Abdominal Viscera, p. 43.

³ Baldrian-extrakt (G.)

title, also, those medicines which consist of the fixed oil of seeds diffused through water by means of the mucilage, fecula, or saccharine matter contained in the seeds, and which have hitherto been denominated *Emulsions*. Both these kinds of preparations should always be extemporaneous; and in prescribing them attention is required not to bring together incompatible substances, nor to order in mixtures insoluble matters of a specific gravity too great to be suspended in the fluid vehicle by the ordinary means.

MISTURA AMMONIACI. Lond. *Mixture of Ammoniac.*

"Take of ammoniac, *two drachms*; water, *half a pint*. Triturate the ammoniac, gradually adding the water until they be thoroughly mixed."

LAC AMMONIACI. Dub. *Milk of Ammoniac.*

"Take of gum ammoniac, *a drachm*; pennyroyal water, *eight fluid ounces*. Triturate the gum, gradually adding the pennyroyal water, until the mixture acquire the appearance of milk, which is to be strained through linen."

The resinous part of the ammoniac is suspended in the water by means of the gummy part; but after a little time the greater portion of the resin subsides. It is coagulated by distilled vinegar, the oxymels, ether, spirit of nitric ether, supertartrate of potash, and oxymuriate of mercury, which are therefore incompatible in prescriptions with mixture of ammoniac. It is advantageously employed as an expectorant in doses of from $\frac{f3}{ss}$ to $\frac{fj}{ss}$, combined with an equal quantity of almond mixture.

MISTURA AMYGDALARUM. Lond. *Almond Mixture.*¹

"Take of almond confection, *two ounces*; distilled water, *a pint*. Add the water gradually to the almond confection whilst triturating, and then strain."

EMULSIO AMYGDALI COMMUNIS. Edin. *Almond Emulsion.*

"Take of sweet almonds, *an ounce*; refined sugar, *half an ounce*; water, *two pounds and a half*. Beat diligently the blanched almonds in a stone mortar, adding the water gradually; then strain."

LAC AMYGDALÆ. Dub. *Almond Milk.*

"Take of sweet almonds, blanched, *an ounce and a half*; purified sugar, *half an ounce*; water, *two pints and a half*. Rub the almonds with the sugar, adding the water gradually; then strain."

EMULSIO ACACIÆ ARABICÆ. Edin. *Emulsion of Gum Arabic.*²

¹ Emulsion d'Amandes (F.) Mandelmilch (G.) Latte di Mandorle (I.)

² Emulsion de Gomme Arabique (F.) Emulsione di Gomma Arabica (I.)

“Take of mucilage of gum arabic, *two ounces*; almonds, *an ounce*; refined sugar, *half an ounce*; water, *two pounds and a half*. Blanch the almonds, and then beat them in a stone mortar with the sugar and the mucilage, gradually adding the water; then strain through linen.”

EMULSIO ARABICA. Dub. *Arabic Emulsion.*

“Take of gum arabic in powder, *two drachms*; sweet almonds blanched, purified sugar, of each *half an ounce*; decoction of barley, *a pint*. Dissolve the gum in the warm decoction, and when it is almost cold, pour it gradually upon the almonds previously beaten to a paste with the sugar, triturating at the same time so as to form a milky mixture; then strain.”

In these preparations the oil of almonds is diffused through the water, and suspended in it by the mucilage and fecula the almonds contain; the gum in the two latter preparations contributing nothing to this effect. The confection ordered by the London College affords an expeditious mode of making the mixture, but does not prevent the necessity of straining. The use of distilled water is an unnecessary refinement.

Qualities.—These emulsions are inodorous, bland, milky fluids. The oil, after some time, rises like a thick cream to the surface; and in forty-eight hours the acetous fermentation commences, and the mixtures become sour. They are decomposed by acids, oxymel, and syrup of squill, spirits, and tinctures, (unless these be in small quantity,) tartrate and supertartrate of potash, supersulphate of potash, oxymuriate of mercury, acetate of lead, and spirit of nitric ether, which are therefore incompatible in prescriptions with almond emulsions.

Medical properties and uses.—These mixtures are in common use as diluents and demulcents in inflammatory fevers, strangury, dysury, and other affections of the urinary organs; but they are chiefly useful as pleasant vehicles for the exhibition of more active remedies. The dose is from fʒij. to ʒss. frequently repeated.

MISTURA ASSAFCETIDÆ. Lond. *Mixture of Assa-fetida.*

“Take of assafoetida, *two drachms*; water, *half a pint*. Triturate the assafoetida, gradually adding the water to it, until they be thoroughly mixed.”

LAC ASSAFCETIDÆ. Dub. *Milk of Assafoetida.*

“Take of assafoetida, *a drachm*; pennyroyal water, *eight fluid ounces*. Triturate the assafoetida, gradually adding the water until it forms an emulsion.”

Owing to the disagreeable flavour of assafoetida, it is seldom given by the mouth in this form, which is chiefly employed as an enema in flatulent colic, worms, and the convulsions of in-

ants arising from irritations of the bowels during dentition. When given by the mouth, the dose may be from $\text{f}\overline{\text{z}}\text{ss}$. to $\text{f}\overline{\text{z}}\text{jss}$. frequently repeated.

MISTURA CAMPHORÆ. Lond. *Mixture of Camphor.*¹

"Take of camphor, *half a drachm*; rectified spirit, *ten minims*; water, *a pint*. Rub the camphor first with the spirit, then add the water gradually, and strain."

MISTURA CAMPHORATA. Dub. *Camphorated Mixture.*

"Take of camphor, *a scruple*; rectified spirit of wine, *ten drops*; refined sugar, *half an ounce*; water, *a pint*. Rub the camphor first with the spirit, and then with the sugar; add the water during the trituration, and strain the mixture through linen."

A pint of water takes up scarcely more than one half the quantity of camphor ordered by the London College; but it communicates to it both odour and taste in a considerable degree. Solution of pure potash separates the camphor. It is an elegant vehicle for more active remedies in low fevers and nervous affections. The dose is from $\text{f}\overline{\text{z}}\text{j}$. to $\text{f}\overline{\text{z}}\text{ij}$. given every three or four hours.

EMULSIO CAMPHORÆ. Edin. *Camphor Emulsion.*

"Take of camphor, *a scruple*; sweet almonds blanched, refined sugar, each *half an ounce*; water, *a pint and a half*. It is to be made in the same manner as the common almond emulsion."

In this preparation the whole of the camphor is diffused through the mixture; the medicinal powers of which are consequently more considerable than those of the foregoing preparation. It is less apt to excite nausea and uneasiness at the stomach than camphor taken in the solid state, and is given with advantage in typhus and nervous cases in doses of $\text{f}\overline{\text{z}}\text{ij}$. every three or four hours. Its preparation should always be extemporaneous, as the camphor separates and swims on the surface of the mixture after a few days.

MISTURA CORNU USTI. Lond. DECOCTUM CORNU CERVINI. Dub. *Mixture of burnt Hartshorn.*

"Take of burnt hartshorn, *two ounces*; acacia gum, in powder, *an ounce* (*three drachms*, Dub.); water, *three pints*. Boil down to two pints, constantly stirring, and strain."

This is the most unchemical, injudicious, and useless preparation in the pharmacopœias which have admitted it; being a simple diffusion of insoluble phosphate of lime in a thin mucilage.

MISTURA CRETÆ. Lond. Dub. *Mixture of Chalk.*

¹ Mixture Camphré (F.) Kampfermixture (G.) Mistura Canforata (I.)

"Take of prepared chalk, *half an ounce*; refined sugar, *three drachms*; acacia gum, in powder, *half an ounce* (*an ounce*, Dub.); water, *a pint*. Mix, by trituration."

POTIO CARBONATIS CALCIS. Edin. *Chalk Potion*.

"Take of prepared carbonate of lime (chalk), *one ounce*; refined sugar, *half an ounce*; mucilage of gum arabic, *two ounces*. Rub them together, and then gradually add of water, *two pounds and a half*; spirit of cinnamon, *two ounces*. Mix them."

These are common and useful forms of giving chalk in acidity of the primæ viæ; and combined with opium or catechu in diarrhœa. The dose is from fʒj. to fʒij. given every three or four hours; or after every liquid evacuation.

MISTURA FERRI COMPOSITA. Lond. ¹ *Compound Mixture of Iron*.

"Take of myrrh, in powder, *a drachm*; subcarbonate of potash, *twenty-five grains*; rose-water, *seven fluid ounces and a half*; sulphate of iron, in powder, *a scruple*; spirit of nutmeg, *half a fluid ounce*; refined sugar, *a drachm*. Rub together the myrrh, the subcarbonate of potash, and the sugar, and while triturating, add first the rose-water and the spirit of nutmeg, and afterwards the sulphate of iron. Put the mixture immediately into a proper glass vessel, and keep it closely stopped."

In this mixture the sulphate of iron is decomposed by the subcarbonate of potash forming, by the change of constituents which takes place, sulphate of potash and subcarbonate of iron; the former of which is dissolved, while the latter is diffused through the mixture, and kept suspended by the myrrh, which forms a saponaceous compound with the excess of alkali. The iron is in the state of a suboxide; and as it rapidly attracts oxygen in this state, and is converted into the red oxide, it is necessary to keep the mixture very well excluded from the air.

Medical properties and uses.—This mixture, which is nearly the same as the celebrated antihectic mixture of Dr. Griffith, is an useful tonic, in all cases in which preparations of iron are indicated, particularly in hysteria and chlorosis, and in phthisis, when no active inflammatory diathesis subsists. The dose is from fʒj. to fʒij. given two or three times in a day.

MISTURA GUAIACI. Lond. *Mixture of Guaiac*.

"Take of guaiac, *a drachm and a half*; refined sugar, *two drachms*; mucilage of acacia gum, *two fluid drachms*; cinna-

¹ This name is certainly improper; but it is not easy to invent one which would be descriptive of the compound, and yet be sufficiently concise: *Mistura subcarbonatis ferri cum myrrha* would have been less objectionable.

mon water, *eight fluid ounces*. Rub the guaiac with the sugar, then with the mucilage, and during the trituration add gradually the cinnamon water."

This is a convenient mode of exhibiting guaiac. It is given in doses of from $\text{f}\overline{3}\text{ss}$. to $\text{f}\overline{3}\text{ij}$. two or three times a day; diluting freely with tepid barley-water or gruel to assist its operation.

MISTURA MOSCHI. Lond. *Mixture of Musk.*

"Take of musk, acacia gum, in powder, refined sugar, of each, *a drachm*; rose-water, *six fluid ounces*. Rub the musk with the sugar, then with the gum, and add gradually the rose-water."

The quantity of gum ordered is scarcely sufficient to retain the musk suspended in the mixture. It is a convenient form of exhibiting the remedy, and may be given to the extent of $\text{f}\overline{3}\text{ij}$. every three or four hours in spasmodic affections, and the sinking state of typhus. The late Mr. White of Manchester, found this mixture combined with ammonia zss . spirit of lavender $\text{f}\overline{3}\text{j}$. and spirit of juniper $\text{f}\overline{3}\text{j}$. of great utility in sloughing phagedenic ulcers of a syphilitic and strumous nature.

ENEMA CATHARTICUM. Dub. *Purging Clyster.*

"Take of manna, *an ounce*; dissolve it in compound decoction of chamomile, *ten fluid ounces*; then add of olive oil, *an ounce*; sulphate of magnesia, *half an ounce*. Mix them."

ENEMA FETIDUM. Dub. *Fetid Clyster.*

"It is to be prepared by adding to the purging clyster *two drachms* of assafoetida."

SPIRITUS.

SPIRITS.

UNDER this title are placed alcohol and spirituous solutions of vegetable matter, chiefly volatile oils, formed by simple mixture, by maceration, and by distillation. They are uniform, transparent, unchanging solutions, containing, in general, a large proportion of volatile oil; and when well prepared, are free from empyreuma. Pure alcohol is more volatile than many of the volatile oils, which do not therefore rise in distillation with it; and, consequently, proof or distilled spirit is employed. As medicinal agents the spirits are stimulant and cordial; but sometimes bad habits are acquired from their continued use. They are employed to cover the taste and flavour of disagreeable medicines; and to make some, which are apt to produce nausea, sit light upon the stomach.

Mixture avec le musc (F.) Mixture Muschiato (I.)

ALCOHOL. Lond. *Alcohol.*¹

"Take of rectified spirit, *a gallon*; subcarbonate of potash, *three pounds*. Add a pound of the subcarbonate previously heated to 300 degrees to the spirit, and macerate for twenty-four hours, frequently shaking the mixture: then pour off the spirit, and add the remainder of the subcarbonate heated to the same degree: lastly, distil the alcohol from a water-bath, and preserve it in a well closed vessel. The specific gravity of alcohol is to that of distilled water, as .815 to 1.000."

ALCOHOL. Dub. *Alcohol.*

"Take of rectified spirit of wine, *a gallon*; pearl-ashes dried, at a heat of 300°, and still hot, *a pound*; caustic kali, in powder, *an ounce*; muriate of lime, dried, *half a pound*. Mix the spirit and the kali; add the pearl-ashes, previously reduced to powder, and digest the mixture for three days in a closed vessel, frequently shaking it; then pour off the spirit; mix with it the muriate of lime; and, lastly, distil with a moderate heat, until the residue begins to thicken. The specific gravity of this spirit is to that of distilled water, as .815 to 1.000.

"The muriate of lime may be conveniently obtained from the residue of the distillation of water of ammonia."

Rectified spirit, of the specific gravity of 835, contains about fifteen per cent. of water; and to free it from this is the intention of the above processes. The affinity of the alkali and the muriate of lime for water is much greater than that of the spirit; it is therefore attracted by these substances, and prevented from rising with the spirit during the distillation, by which means the alcohol comes over in a very highly concentrated state. The process of the Dublin College is to be preferred, muriate of lime being a much more powerful agent for separating the water than subcarbonate of potash. By its means, Dr. Black obtained alcohol of the specific gravity of 800°; and Richter procured it so low as 0.792, in the temperature of 68° Fahrenheit; at which degree of concentration it may be regarded almost as pure alcohol, or alcohol perfectly free from water. The alcohol of the pharmacopœias, therefore, is not free from water, but it is sufficiently concentrated for all the purposes of pharmacy. Alcohol chemically combines with water: the bulk of the resulting mixture is less than the mean of the two liquids before admixture; and much caloric is evolved. It is highly inflammable; and during its combustion water and carbonic acid are formed, the quantity of the water exceeding that of the alcohol consumed. Alcohol boils at 176°, and as its boiling point is higher the more water it contains, its strength may be known by the degree at which it boils; allowing for the

¹ Alcohol (F.) Höchst rektifizirter Weingiest (G.) Alcoole (I.)

² Crell's *Annals*, 1796, ii. 211.

atmospheric pressure under which it is tried. It cannot be frozen by any known degree of cold. As a pharmaceutical agent, alcohol, both in its pure and diluted state, is of the utmost importance.

The following Table drawn up by Lowitz, with an additional column by Dr. Thomson, shows the Specific Gravity of different Mixtures of pure Alcohol of a specific gravity .791, and Distilled Water, at the temperatures of 60° and 68° of Fahrenheit.

100 parts by weight.		Sp. Gravity		100 parts by weight.		Sp. Gravity		100 parts by weight.		Sp. Gravity	
Alco.	Wat.	at 68°	at 60°	Alco.	Wat.	at 68°	at 60°	Alco.	Wat.	at 68°	at 60°
100	—	791	796	66	34	877	880	32	68	952	955
99	1	794	798	65	35	880	883	31	69	954	957
98	2	797	801	64	36	882	886	30	70	956	958
97	3	800	804	63	37	885	889	29	71	957	960
96	4	803	807	62	38	887	891	28	72	959	962
95	5	805	809	61	39	889	893	27	73	961	963
94	6	808	812	60	40	892	896	26	74	963	965
93	7	811	*815	59	41	894	898	25	75	965	967
92	8	813	817	58	42	896	900	24	76	966	968
91	9	816	820	57	43	899	903	23	77	968	970
90	10	818	822	56	44	901	904	22	78	970	972
89	11	821	825	55	45	903	906	21	79	971	973
88	12	823	827	54	46	905	908	20	80	973	974
87	13	826	830	53	47	907	910	19	81	974	975
86	14	828	832	52	48	909	912	18	82	976	
85	15	831	†835	51	49	912	915	17	83	977	
84	16	834	838	50	50	914	917	16	84	978	
83	17	836	†840	49	51	917	920	15	85	980	
82	18	839	843	48	52	919	922	14	86	981	
81	19	842	846	47	53	921	924	13	87	983	
80	20	844	848	46	54	923	926	12	88	985	
79	21	847	851	45	55	925	928	11	89	986	
78	22	849	853	44	56	927	930	10	90	987	
77	23	851	855	43	57	930	933	9	91	988	
76	24	853	857	42	58	932	935	8	92	989	
75	25	856	860	41	59	934	937	7	93	991	
74	26	859	863	40	60	936	939	6	94	992	
73	27	861	865	39	61	938	941	5	95	994	
72	28	863	867	38	62	940	943	4	96	995	
71	29	866	870	37	63	942	945	3	97	997	
70	30	868	871	36	64	944	947	2	98	998	
69	31	870	874	35	65	946	949	1	99	999	
68	32	872	875	34	66	948	951	—	100	1000	
67	33	875	879	33	67	950	953				

* Alcohol of the Lond. and the Dub. Pharm. † Ditto, (Edin.) rectified spirit, (Lond.) ‡ Rectified spirit, (Dub.) § Proof spirit, (Lond. Dub.) || Ditto, (Edin.)

TABLE, extracted from the Tables of Mr. Gilpin, showing the Real Specific Gravity of different Mixtures of Spirit and Water at every 5° of temperature from 50° to 70°. The standard spirit employed was of the specific gravity 0·825; or contained 89 pure alcohol, and 11 water, in 100 parts.

Proportions by weight of		REAL SPECIFIC GRAVITY				
Spirit.	Water	at 50°.	at 55°.	at 60°.	at 65°.	at 70°.
100	—	·82977	·82736	·82500	·82262	·82023
100	5	·84076	·83834	*·83599	·83362	·83124
100	10	·85042	·84802	·84568	·84334	·84092
100	15	·85902	·85664	·85430	·85193	·84951
100	20	·86676	·86441	·86208	·85975	·85736
100	25	·87384	·87150	·86918	·86680	·86415
100	30	·88030	·87796	·87569	·87337	·87105
100	35	·88626	·88393	·88169	·87938	·87705
190	40	·89174	·88945	·88720	·88490	·88254
100	45	·89684	·89458	·89232	·89006	·88773
100	50	·90160	·89933	·89707	·89479	·89252
100	55	·90596	·90367	·90144	·89920	·89695
100	60	·90997	·90768	·90549	·90328	·90104
100	65	·91370	·91144	·90927	·90707	·90484
100	70	·91723	·91502	·91227	·91066	·90847
100	75	·92051	·91837	·91622	·91400	·91181
100	80	·92358	·92145	·91933	·91715	·91493
100	85	·92647	·92436	·92215	·92010	·91793
100	90	·92919	·92707	·92499	·92283	·92069
100	95	·93177	·92960	·92758	·92546	·92333
100	100	·93419	·93208	†·93002	·92794	·92580
100	95	·93658	·93462	·83247	·93040	·92828
109	90	·93897	·93696	‡·93493	·93285	·93076
100	85	·94149	·93948	·93749	·93546	·93337
100	80	·94414	·94213	·94018	·93822	·93616
105	75	·94683	·94486	·94296	·94099	·93898
100	70	·94958	·94767	·94579	·94388	·94193
100	65	·95243	·95087	·94876	·94689	·94500
100	60	·95534	·95467	·95181	·95000	·94813
100	55	·95831	·95662	·95493	·95318	·95139
100	50	·96126	·95966	·95804	·95635	·95469
100	45	·96420	·96262	·96122	·95962	·95802
100	40	·96708	·96595	·96437	·96288	·96143
100	35	·96995	·96277	·96752	·96620	·96484
100	30	·97284	·97181	·97074	·96959	·96836
100	25	·97589	·97800	·97410	·87309	·97203
100	20	·97920	·97887	·97771	·97688	·97596
100	15	·98293	·98289	·98176	·98106	·98028
100	10	·98745	·98702	·98654	·98594	·98527
100	5	·99316	·99284	·99244	·99194	·99134

* Phil. Trans. for 1794, p. 320—370. * Alcohol, (Edin.) Rectified spirit, (Lond.)

† Proof spirit, (Lond. Dub.)

‡ Proof spirit, (Edin.)

SPIRITUS AMMONIÆ.¹ Lond. *Spirit of Ammonia.*

"Take of rectified spirit, *three pints*; muriate of ammonia, *four ounces*; subcarbonate of potash, *six ounces*. Mix, and, by a gentle heat, distil over a pint and a half of spirit of ammonia into a receiver which is kept cold."

ALCOHOL AMMONIATUM. Edin. *Ammoniated Alcohol.*

"Take of alcohol (835), *thirty-two ounces*; lime, recently burnt, *twelve ounces*; muriate of ammonia, *eight ounces*; water, *six ounces*. From these ammoniated alcohol is prepared exactly in the same manner as water of ammonia."

SPIRITUS AMMONIÆ. Dub. *Spirit of Ammonia.*

"Take of proof spirit, *three pints*; muriate of ammonia, *four ounces*; pot-ashes, *six ounces*. Mix them, and distil with a moderate heat two pints."

In these processes, the muriate of ammonia is decomposed by the lime, which attracts the muriatic acid, while the ammonia is extricated in a pure state, volatilized, and readily combines with the alcohol. Muriate of lime remains in the retort. The present formula of the London and of the Dublin Colleges is the same. It does not yield a solution of pure ammonia in alcohol, but a mixed solution of a small portion of ammonia in spirit, and a portion of subcarbonate of ammonia in water; a portion of subcarbonate of ammonia also sublimes, and remains undissolved in the distilled product.

This spirit properly prepared has the pungent odour and acrid taste of ammonia, with which it coincides in its medicinal properties. It is chiefly used for pharmaceutical purposes.

Official preparations. *Spiritus Ammoniac compositus*. L. E. D. *Spiritus Ammoniac fetidus*. L. E. D. *Tinctura Castorei composita*. E. *Tinctura Guaiaci composita*. E. *Tinctura Opii ammoniata*. E.

SPIRITUS AMMONIÆ AROMATICUS.² Lond. *Aromatic Spirit of Ammonia.*

"Take of cinnamon bark bruised, cloves bruised, of each, *two drachms*; lemon-peel, *four ounces*; subcarbonate of potash, *half a pound*; muriate of ammonia, *five ounces*; rectified spirit, *four pints*; water, *a gallon*. Mix, and distil over six pints."

TINCTURA AMMONIATUM AROMATICUM. Edin. *Aromatic ammoniated Tincture.*

"Take of ammoniated alcohol, *eight ounces*; volatile oil of rosemary, *a drachm and a half*; volatile oil of lemons, *a drachm*. Mix them so as to dissolve the oils."

SPIRITUS AMMONIÆ AROMATICUS. Dub. *Aromatic Spirit of Ammonia.*

¹ Spiritus Salis ammoniaci dulcis, P. L. 1745. Alcohol Ammoniacal (F.) Gristiger Ammonium liquor (G.) Alcoleo Ammoniato (I.)

² Spiritus Ammoniac compositus, P. L. 1787.

“Take of spirit of ammonia, *two pints*; essential oil of lemons, *two drachms*; nutmegs, bruised, *half an ounce*. Digest in a covered vessel for three days, frequently shaking the vessel; then distil *a pound and a half*.”

For these latter preparations it is necessary that the oils be pure; for if they contain fixed oil, as is often the case with the volatile oils imported into this country, the mixture is rendered turbid and coloured. It is turbid also with pure oils if the spirit of ammonia contain any carbonate of ammonia, as must be the case in the Dublin preparation; in which case it is necessary to distil the mixtures.

Medical properties and uses.—This spirit is an useful stimulant in languors, and flatulent colic; and the oils render it more grateful to the stomach than the simple spirit of ammonia. The dose is from fʒss. to fʒj. in any convenient vehicle.

Official preparations. *Tinctura Guaiaci ammoniata*. L. D. *Tinctura Valerianæ ammoniata*. L. D.

SPIRITUS AMMONIÆ FÆTIDUS.¹ Lond. Dub. *Fætid Spirit of Ammonia.*

“Take of spirit of ammonia, *two pints*; assafœtida, *two ounces*, (*one ounce and a half*, Dub.) Macerate for twelve hours (for three days, in a covered vessel, with frequent agitation, Dub.); then by a gentle fire distil one pint and a half into a cold receiver.”

TINCTURA ASSAFÆTIDÆ AMMONIATA. Edin. *Ammoniated Tincture of Ammonia.*

“Take of ammoniated alcohol, *eight ounces*; assafœtida, *half an ounce*. Digest them in a close vessel for twelve hours; then distil eight ounces by the heat of boiling water.”

In these processes the fætid volatile oil of the gum resin is dissolved in the spirit of ammonia, and its odour and flavour communicated to it; but very little else is taken up. Its medicinal properties are not different from those of the preceding spirit; and its dose is the same. It acquires colour from age.

SPIRITUS AMMONIÆ SUCCINATUS. Lond. *Succinated Spirit of Ammonia.*²

“Take of mastich, *three drachms*; alcohol, *nine fluid drachms*; oil of lavender, *fourteen minims*; oil of amber, *four minims*; solution of ammonia, *ten fluid ounces*. Macerate the mastich in the alcohol, that it may be dissolved, and pour off the clear tincture; then add the other ingredients, and mix them by agitation.”

The preparation of this name in the Pharmacopœia of 1787 did not preserve the milky appearance characteristic of the eau-

¹ Spiritus volatilis fætidus, P. L. 1745.

² Eau de Luce (F.) Ammoniaca Succinata (L.)

de-luce, for which it was intended to be a substitute: and therefore the present formula is given as furnishing a compound capable of preserving its milkiness for a very considerable time. It is employed as a stimulant and antispasmodic in the same cases as the oil of amber; and has been successfully used in India against the bite of the rattlesnake. The dose is from m x. to f3iss. given in any convenient vehicle.

SPIRITUS ANISI. Lond. *Spirit of Aniseed.*¹

"Take of aniseeds bruised, *half a pound*; proof spirit, *a gallon*; water, *a sufficient quantity to prevent empyreuma*. Macerate for twenty-four hours; then distil by a gentle fire."

SPIRITUS ANISI COMPOSITUS. Dub. *Compound Spirit of Aniseed.*

"Take of aniseeds bruised, angelica seeds bruised, of each, *half a pound*; proof spirit, *a gallon*; water, *sufficient to prevent empyreuma*. Distil one gallon."

These are pleasant carminatives in flatulent colic, and similar affections. The dose is from f3iss. to f3iv. in water.

SPIRITUS ARMORACIÆ COMPOSITUS. Lond. *Compound Spirit of Horse-Radish.*

"Take of fresh horse-radish, sliced, orange-peel dried, of each, *a pound*; nutmegs bruised, *half an ounce*; proof spirit, *a gallon*; water, *sufficient to prevent empyreuma*. Macerate for twenty-four hours; and distil a gallon by a gentle fire."

SPIRITUS RAPHANI COMPOSITUS. Dub. *Compound Spirit of Horse-Radish.*

"Take of fresh horse-radish dried, peel of Seville oranges, of each, *two pounds*; fresh garden scurvy-grass, *four pounds*; nutmegs bruised, *an ounce*; proof spirit, *two gallons*; water, *sufficient to prevent empyreuma*. Distil two gallons."

These spirits were formerly used as antiscorbutics, but they possess little value as such; and are now chiefly used in dropsies attended with much debility. The dose is from f3j. to f3iv. combined with infusion of foxglove or of juniper berries.

SPIRITUS CAMPHORÆ. Lond. **SPIRITUS CAMPHORATUS.** Dub. *Spirit of Camphor.*²

"Take of camphor, *four ounces*; rectified spirit, *two pints*. Mix, that the camphor may be dissolved."

TINCTURA CAMPHORÆ. Edin. *Tincture of Camphor.*

"Take of camphor, *an ounce*; alcohol (sp. grav. 835), *a pound*. Mix, that the camphor may be dissolved. It may also be made with double or triple the quantity of camphor."

The strength of the spirit renders this preparation unfit to

¹ Alcohol d'Anis (F.) Alcoole Anisato (I.)

² Alcohol Camphré (F.) Kampfer Spiritus (G.) Alcoole Canforato (I.)

be given internally; and the addition of water, with the view of diluting it, separates the camphor. It is an useful stimulant and discutient application to chilblains, and in chronic rheumatism, paralytic numbness, and gangrene.

SPIRITUS CARUI. Lond. Dub. *Spirit of Carraway.*²

"Take of carraway seeds bruised, *a pound and a half*, (*half a pound*, Dub.); proof spirit, *a gallon*; water, *sufficient to prevent empyreuma*. Macerate for twenty-four hours, then distil a gallon by a gentle fire."

SPIRITUS CARI CARUI. Edin. *Spirit of Carraway.*

"Take of carraway seeds bruised, *half a pound*; proof spirit, *nine pounds*. Macerate for two days in a close vessel; then add a sufficient quantity of water to prevent empyreuma, and distil nine pounds."

An useful carminative, and adjunct to griping purgatives.

SPIRITUS CINNAMOMI. Lond. Dub. *Spirit of Cinnamon.*

"Take of cinnamon bark bruised, *a pound*; proof spirit, *a gallon*; water, *sufficient to prevent empyreuma*. Macerate for twenty-four hours; then distil a gallon by a gentle fire."

SPIRITUS LAURI CINNAMOMI. Edin. *Spirit of Cinnamon.*

"To be prepared with a pound of cinnamon bark, in the same manner as the spirit of carraway."

This spirit is an agreeable cordial in diseases attended with much languor and debility. The dose is from fʒj. to fʒiv. in any convenient vehicle.

Official preparation. *Infusum Digitalis. L.*

SPIRITUS JUNIPERI COMPOSITUS. Lond. Dub. Edin. *Compound Spirit of Juniper.*

"Take of juniper berries bruised, *a pound*; carraway seeds bruised, fennel seeds bruised, of each, *an ounce and a half*; proof spirit, *a gallon* (*nine pounds*, Edin.); water, *sufficient to prevent empyreuma*. Macerate for twenty-four hours (*two days*, Edin. Dub.); then distil a gallon (*nine pounds*, Edin.) by a gentle heat."

This spirit is a grateful and useful addition to infusions of foxglove, and other diuretics, in dropsy."

SPIRITUS LAVANDULÆ. Lond. *Spirit of Lavender.*

"Take of fresh lavender flowers, *two pounds*; rectified spirit, *a gallon*; water, *sufficient to prevent empyreuma*. Macerate for twenty-four hours; then distil a gallon by a gentle heat."

Dublin.

"Take of fresh flowers of lavender, *a pound and a half*;

² Alcoole con Carvi (L.)

proof spirit, a gallon; water, sufficient to prevent empyreuma. Distil five pints by a moderate fire."

SPIRITUS LAVANDULÆ SPICÆ. Edin. *Spirit of Lavender.*

"Take of fresh flowers of lavender, two pounds; alcohol, eight pounds. Distil, with the heat of a water-bath, seven pounds."

The oil of lavender is sufficiently volatile to be brought over with rectified spirit, which is also required to extract all the oil from the flowers: for this reason the Dublin process produces a spirit less highly impregnated with the oil. Spirit of lavender is chiefly used as a perfume, and in pharmacy to prepare the following articles.

Official preparations. *Spiritus Lavandulæ compositus.* L. E. D. *Linimentum Camphoræ compositum.* L.

SPIRITUS LAVANDULÆ COMPOSITUS. Lond. Dub. *Compound Spirit of Lavender.*¹

"Take of spirit of lavender, three pints; spirit of rosemary, a pint; cinnamon bark bruised, nutmegs bruised, of each, half an ounce; (cloves, two drachms, Dub.); red saunders-wood, chipped, an ounce. Macerate for fourteen days, (ten days, Dub.) and strain."

Edinburgh.

"Take of spirit of lavender, three pounds; spirit of rosemary, one pound; cinnamon bark bruised, an ounce; nutmegs bruised, two drachms; red saunders-wood rasped, three drachms. Macerate seven days, and strain."

The addition of these aromatics to the spirit of lavender renders it a very grateful cordial and stimulant; very useful in languors and faintings, and as an adjunct to tonic and stomachic infusions. Its dose is from mxxx. to fʒij. either dropped on a piece of sugar, or given in water, in camphor mixture, or any other convenient vehicle.

SPIRITUS MENTHÆ PIPERITÆ. Lond. Edin. *Spirit of Peppermint.*²

"Take of peppermint dried, a pound and a half; proof spirit, a gallon (nine pounds, Edin.); water, sufficient to prevent empyreuma. Macerate for twenty-four hours; then distil a gallon (nine pounds, Edin.) by a gentle heat."

An useful carminative in nausea and flatulence, and as an adjunct to purgative remedies.

SPIRITUS MENTHÆ VIRIDIS. Lond. *Spirit of Spearmint.*

"Take of spearmint dried, a pound and a half; proof spirit, a gallon; water, sufficient to produce empyreuma. Mace-

¹ Teinture alcoolique de Lavande (F.) Lavendel-spiritus (G.)

² Teinture alcoolique de Menthe Poivrée (F.) Alcoleo con Menta piperitide (I.)

rate for twenty-four hours; then distil a gallon by a gentle heat."

In the same cases as the former.

SPIRITUS MYRISTICÆ. Lond. **SPIRITUS MYRISTICÆ MOSCHATÆ.** Edin. **SPIRITUS NUCIS MOSCHATÆ.** *Spirit of Nutmeg.*

"Take of nutmegs bruised, *two ounces*; proof spirit, *a gallon (nine pounds, Edin.)*; water, *sufficient to prevent empyreuma*. Macerate for twenty-four hours; then distil a gallon (*nine pounds, Edin.*) by a gentle heat."

SPIRITUS PIMENTÆ. Lond. **SPIRITUS PIMENTO.** Dub. *Spirit of Pimenta.*

"Take of pimenta berries bruised, *two ounces (three ounces, Dub.)*; proof spirit, *a gallon*; water, *sufficient to prevent empyreuma*. Macerate for twenty-four hours; then distil a gallon by a gentle heat."

SPIRITUS MYRTI PIMENTÆ. Edin. *Spirit of Pimenta.*

"It is to be prepared with *half a pound* of bruised pimenta berries, in the same manner as spirit of carraway."

An useful carminative in flatulent colic, atonic gout, and dyspepsia.

SPIRITUS PULEGII. Lond. *Spirit of Pennyroyal.*

"Take of pennyroyal dried, *a pound and a half*; proof spirit, *a gallon*; water, *sufficient to prevent empyreuma*. Macerate for twenty-four hours; then distil a gallon by a gentle fire."

Similar to spirit of spearmint in its qualities and medicinal properties.

SPIRITUS ROSMARINI. Lond. *Spirit of Rosemary.*¹

"Take of fresh rosemary tops, *two pounds*; proof spirit, *a gallon*; water, *sufficient to prevent empyreuma*. Macerate for twenty-four hours; then distil a gallon in a gentle heat."

SPIRITUS ROSMARINI OFFICINALIS. Edin. *Spirit of Rosemary.*

"Take of fresh rosemary-tops, *two pounds*; alcohol (sp. grav. 335), *eight pounds*. Draw off seven pounds by distillation in a water-bath."

SPIRITUS ROSMARINI. Dub. *Spirit of Rosemary.*

"Take of fresh rosemary-tops, *a pound and a half*; proof spirit, *a gallon*. Distil five pints by a moderate fire."

Oil of rosemary is sufficiently volatile to rise in distillation with rectified spirit, which the Edinburgh College has, therefore, ordered to be used. It is a fragrant perfume, and is chiefly used in the under-mentioned preparations.

Official preparations. *Linimentum Saponis compositum.* L. E. D. *Spiritus Lavandulæ compositus.* L. E. D.

¹ Esprit de Rosmarin (F.) Rosmarien-spiritus (G.) Alcoolé Rosmarinato (I.)

TINCTURÆ.

TINCTURES.¹

THESE are spirituous solutions of such of the proximate principles of vegetables and animals, as are soluble in pure alcohol or in proof spirit. From vegetable matter submitted to its action, alcohol takes up sugar, resin, extractive, tannin, cinchonin, camphor, volatile oils, several acids, and the narcotic principle; proof spirit also takes up the whole of these partially, and is besides the proper menstruum for gum-resins; so that alcohol, either in a concentrated or diluted form, is capable of separating the greater part of the active principles of vegetables from the ligneous inert fibres. The tinctures obtained from animal substances are very few in number, and the principles taken up by the spirit are analogous to those enumerated above, belonging to the vegetable kingdom.

Pure alcohol is required in a very few instances only for the formation of tinctures, proof spirit being adequate for almost every purpose. The dilution of the spirit, however, must be varied according to the known principles of the substance to be submitted to its action: when resin predominates, it must necessarily be more concentrated; when gum-resin or extractive are the most abundant constituents, proof spirit then must be employed. In consequence of the great affinity of water for alcohol, the addition of it to alcoholic tinctures separates the resin, camphor, and volatile oils they contain; but water is generally miscible with tinctures made with proof spirit, without producing any decomposition. Tinctures are not liable to suffer spontaneous decomposition, as is the case with infusions and decoctions; and, independent of the loss which takes place from the evaporation of the spirit and the volatile oils, if the bottles containing tinctures be closely corked, they may be kept for an indefinite length of time, and their virtues remain unimpaired.

Tinctures are prepared by macerating the ingredients in the spirit in a temperature not exceeding 80°, at which degree, by allowing the menstruum to remain on the ingredients for a sufficient length of time, all the principles that can prove useful

¹ Arnold de Villa Nova, who was professor of medicine at Montpellier, invented tinctures about the end of the 13th century.

in the tincture are extracted, and the solvent saturated. The ingredients must be dried and reduced to a coarse powder, and the maceration made in close vessels, and assisted by frequent agitation. When completely made, tinctures should not be allowed to remain upon the ingredients, but be filtered through bibulous paper, and kept in this state in well corked bottles. Parmentier¹ has proposed that one-half only of the spirituous menstruum be added to the ingredients at first, and after digesting for six days this part to be poured off, and the remainder added. In six more the whole is to be strongly expressed, and the two portions of tincture mixed together. By this method he imagines more of the active principles of the ingredients are extracted, and the tinctures obtained of a more uniform strength.

Tinctures are not of very extensive use as remedies, except in cases where stimulants are indicated; the solvent, even in doses of a few fluid drachms, often acting more powerfully on the living system than the principles it holds in solution. In ordinary cases this action, when continued for some time, produces the same deleterious effects as the habitual use of ardent spirits; and often lays the foundation of the pernicious custom of dram-drinking. When the action of a substance is the reverse of stimulant, it cannot with propriety be exhibited in this form, unless the dose be so small that the operation of the spirit cannot be taken into account, as in tincture of fox-glove. The chief use of this class of preparations, therefore, is to enable infusions and decoctions, to which they are added, to sit lighter on the stomach, or to add to them some active principle which water is incapable of extracting.

The general rule given in the London Pharmacopœia for the preparation of tinctures is, "to prepare them in closed vessels, and to shake them frequently during the maceration."

TINCTURA ALOES. Lond. *Tincture of Aloës.*²

"Take of extract of spiked aloës powdered, *half an ounce*; extract of liquorice, *an ounce and a half*; water, *a pint*; rectified spirit, *four fluid ounces*. Macerate in a sand-bath until the extracts are dissolved; then strain."

Dublin.

"Take of socotorine aloës in powder, *half an ounce*; extract of liquorice dissolved in eight ounces of boiling water, *an ounce and a half*; proof spirit, *eight fluid ounces*. Digest for seven days; then strain."

TINCTURA ALÖES SOCOTORINÆ. Edin. *Tincture of Socotorine Aloës.*

¹ *Annales de Chimie*, lxii. 40.

² *Teinture d'Aloës (F.)* Tintura d'Aloe (I.)

"Take of socotorine aloës in powder, *half an ounce*; extract of liquorice, *one ounce and a half*; alcohol, *four ounces*; water, *a pound*. Digest for seven days, with a gentle heat, in a close vessel, which is to be frequently shaken (a circumstance to be attended to in preparing all the tinctures); then pour off the clear tincture."

This may be regarded rather an aqueous solution than a tincture, the quantity of spirit being too small to serve any other purpose than that of preventing decomposition. It may be used in the same cases as the extract of aloës; but, notwithstanding the presence of the liquorice, the bitterness of the aloës is so intense and disagreeable, as to prevent it from being often prescribed. Its dose is from $f\overline{3}ls.$ to $f\overline{3}jls.$

TINCTURA ALOËS ÆTHEREA. Edin. *Ethereal Tincture of Aloës.*

"Take of socotorine aloës, myrrh, of each, in powder, *an ounce and a half*; English saffron cut, *an ounce*; sulphuric ether with alcohol, *a pound*. Digest the myrrh with the ether for four days, in a closed bottle; then add the saffron and the aloës. Digest again for four days, and when the dregs have subsided, pour off the tincture."

The spirit of sulphuric ether is supposed to afford a more grateful tincture than spirit of wine; and in cases attended with spasm, as in hysteria attendant on obstructed menstruation, this solvent may prove serviceable, independent of the matter it holds in solution. It is a warm stomachic purgative, and is advantageously given in dyspeptic affections, jaundice, gout, chlorosis, and other cases in which aloëtics are indicated. In doses of $f\overline{3}j.$ or $f\overline{3}ij.$ it acts chiefly as a stomachic; but purges briskly in larger doses.

TINCTURA ALOËS COMPOSITA. Lond. Dub. *Compound Tincture of Aloës.*¹

"Take of extract of spiked aloës powdered, saffron, of each, *three ounces*; tincture of myrrh, *two pints*. Macerate for fourteen days (seven days, *Dub.*), and strain."

TINCTURA ALOËS ET MYRRHÆ. Edin. *Tincture of Aloës and Myrrh.*

"Take of myrrh in powder, *two ounces*; alcohol, *a 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, of socotorine aloës in powder, *one ounce and a half*; English saffron cut in pieces, *one ounce*. Digest again for three days, and pour off the clear tincture."

This tincture, which differs in little, except the solvent, from

¹ Alcohol avec l'Aloë et la Myrrhe (F.) Alcoolé Aloë Mirrato (I.)

the former, may be used in the same cases; and the same dose of it may be given. It is occasionally used as a local stimulant to foul ulcers.

TINCTURA ASSAFŒTIDÆ. Lond. *Tincture of Assafœtida.*¹

"Take of assafœtida, *four ounces*; rectified spirit, *two pints*. Macerate for fourteen days, and strain."

Dublin.

"Take of assafœtida, *four ounces*; rectified spirit of wine, *two pints*; water, *eight fluid ounces*. Add the spirit to the assafœtida previously triturated with water; then digest for seven days, and strain."

TINCTURA FERULÆ ASSAFŒTIDÆ. Edin. *Tincture of Assafœtida.*

"Take of assafœtida, *four ounces*; alcohol, *two pounds and a half*. Digest for seven days, and filter through paper."

When this tincture is added to water or aqueous infusions, it renders them of a milky hue, owing to the separation of the resin. It is given in the same cases as crude assafœtida, in doses of fʒj. or more.

Official preparation. *Enema fœtidum*. D.

TINCTURA AURANTII. Lond. Dub. *Tincture of Orange-peel.*²

"Take of fresh orange-peel, *three ounces*; proof spirit, *two pints*. Macerate for fourteen days, (three days, *Dub.*) and filter."

This tincture is not decomposed by water, and may therefore be added to infusions and decoctions, to which it is an useful adjunct in dyspepsia, besides communicating its agreeable flavour.

TINCTURA BENZOINI COMPOSITA. Lond. TINCTURA BENZÖES COMPOSITA. Dub. *Compound Tincture of Benzoin.*³

"Take of benzoin, *three ounces*; storax balsam strained, *two ounces*; balsam of Tolu, *an ounce*; extract of spiked aloës, *half an ounce*; rectified spirit, *two pints*. Macerate for fourteen days, (seven days, *Dub.*) and filter."

TINCTURA BENZOINI COMPOSITA. Edin. *Compound Tincture of Benzoin.*⁴

"Take of benzoin in powder, *three ounces*; balsam of Peru, *two ounces*; hepatic aloës in powder, *half an ounce*;

¹ Teinture d'Assafœtide (F.) Ascande tinktur (G.) Alcoole asfetidato (I.)

² Pomeranzan schalen tinktur (G.)

³ Teinture de Benzoin composé (F.) Zusammengesetzte Benzoe tinktur (G.)

⁴ Tintura del Commendatore; Alcoole Benzoato composito (I.)

alcohol, *two pounds*. Digest for seven days, and filter through paper."

This tincture is a stimulating expectorant, and as such is sometimes prescribed in chronic catarrh and old asthmatic cases; but it is chiefly employed as an external application to wounds and languid ulcers, which it gently stimulates, and shields from the action of the air.¹ It is decomposed by water, and therefore, when given internally, must be triturated with yolk of egg or mucilage, to suspend it in aqueous fluids. Its dose is from fʒss. to fʒij. or more.

TINCTURA BONPLANDIÆ TRIFOLIATA. Edin. *Tincture of Bonplandia, or Angustura.*

"Take of the bark of trifoliate bonplandia bruised, *two ounces*; proof spirit, *two pounds and a half*. Digest for seven days, and filter through paper."

TINCTURA ANGUSTURÆ. Dub. *Tincture of Angustura.*²

"Take of angustura bark in coarse powder, *two ounces*; proof spirit, *two pints*. Digest for seven days; then filter."

This tincture, which contains the active principles of the angustura, is given in doses of fʒj. or fʒij. in the same cases as the bark. (See *Cusparia*, Part ii.)

TINCTURA CALUMBÆ. Lond. *Tincture of Calumba.*

"Take of calumba root sliced, *two ounces and a half*; proof spirit, *two pints*. Macerate for fourteen days, and filter."

TINCTURA COLOMBÆ. Edin. TINCTURA COLOMBO. Dub. *Tincture of Calumba.*

"Take of colomba root in powder, *two ounces*; proof spirit, *two pounds*. Digest for seven days, and filter through paper."

An useful addition to stomachic infusions and decoctions.

TINCTURA CAMPHORÆ COMPOSITA.³ Lond. *Compound Tincture of Camphor.*

"Take of camphor, *two scruples*; hard opium, powdered, acid of benzoin, of each, *one drachm*; proof spirit, *two pints*. Macerate for fourteen days, and filter."

TINCTURA OPII CAMPHORATA, sive ELIXIR PAREGORICUM ANGLORUM. Edin. Dub. *Camphorated Tincture of Opium, or Paregoric Elixir.*

"Take of camphor, *two scruples*; hard purified opium in powder, benzoic acid, of each, *a drachm*; proof spirit, *two pints*. Digest for seven (ten Dub.) days, then filter."

¹ It is an improved form of Wade's Balsam, or Friar's Balsam.

² Teinture d'Angusture (F.)

³ The change of name here imposed, appears to us to be more likely to produce errors than the old name; and it is directly opposed to the principles of nomenclature adopted by the College. Teinture Camphrée d'Opium (F.) Opiumtinktur mit Benzoe (G.)

Half a fluid ounce of this tincture contains nearly a grain of opium. It has been long known under the titles *Paregoric Elixir* and *Asthmatic Elixir*; and is an useful anodyne in chronic asthma, hooping-cough, and catarrh after the inflammatory symptoms have abated; in which it contributes to allay the tickling which induces the frequent cough. The dose is from $\text{f}\text{ʒj.}$ to $\text{f}\text{ʒiij.}$ occasionally in the above cases, using after it the inhaler; and $\text{f}\text{ʒiij.}$ in cases where quiet, rather than sleep, is required.

TINCTURA CAPSICI. Lond. *Tincture of Capsicum.*

“Take of capsicum berries, *an ounce*; proof spirit, *two pints*. Macerate for fourteen days, and filter.”

This is a convenient form for exhibiting capsicum in tympanitis, cynanche maligna, the low stage of typhus, and in similar cases. The dose is from $\text{f}\text{ʒss.}$ to $\text{f}\text{ʒj.}$; and a mixture of $\text{f}\text{ʒvj.}$ with half a pint of water will answer all the purposes of the capsicum gargle.

TINCTURA CARDAMOMI. Lond. Dub. *Tincture of Cardamoms.*

“Take of cardamom seeds husked and bruised, *three ounces*; proof spirit, *two pints*. Macerate for fourteen days, (seven days, *Dub.*) and filter.”

TINCTURA AMOMI REPENTIS. Edin. *Tincture of Cardamoms.*

“Take of lesser cardamom seeds bruised, *four ounces*; proof spirit, *two pounds and a half*. Digest for seven days, and filter through paper.”

TINCTURA CARDAMOMI COMPOSITA. Lond. Dub. *Compound Tincture of Cardamoms.*

“Take of cardamom seeds, (husked, *Dub.*) carraway seeds, cochineal, of each, in powder, *two drachms*; cinnamon bark bruised, *half an ounce*; raisins stoned, *four ounces*; proof spirit, *two pints*. Macerate for fourteen days, and filter.”

The raisins are properly omitted in the Dublin formula. Both the simple and the compound tinctures of cardamoms are agreeable cordials, and form elegant adjuncts to stomachic infusions.

TINCTURA CASCARILLÆ.¹ Lond. Dub. *Tincture of Cascarilla.*

“Take of cascarilla bark powdered, *four ounces*; proof spirit, *two pints*. Macerate for fourteen days, (seven days, *Dub.*) and filter.”

TINCTURA CROTONIS ELEUTHERIÆ. Edin. *Tincture of Croton Eleutheria, or Cascarilla.*

“Take of croton eleutheria bruised, *four ounces*; proof spirit,

¹ Cascarillentinctur (G.)

two pounds and a half. Digest for seven days, and filter through paper."

This tincture may be regarded as superfluous, as it is scarcely ever ordered.

TINCTURA CASTOREI.¹ Lond. **TINCTURA CASTOREI** (ROSSICI, CANADENSIS.) Dub. *Tincture of Castor.*

"Take of castor powdered, *two ounces*; rectified spirit, (proof spirit, *Dub.*) *two pints*. Macerate for seven days, and filter."

Edinburgh.

"Take of castor powdered, *an ounce and a half*; alcohol, *a pound*. Macerate for seven days, and filter through paper."

Rectified spirit is the preferable solvent for the active parts of castor, which are resin and a volatile oil; and it also affords a more grateful tincture than that made with proof spirit. The tincture is supposed to possess the medical properties of the castor, and is used in similar cases. The dose is from $\mathfrak{m}$ xx. to $\mathfrak{f}\mathfrak{z}\mathfrak{j}$.

The Dublin College orders a "*tincture of Russian castor*," and a "*tincture of Canadian castor*," which is an unnecessary refinement. The Russian castor is the best, and should always be preferred when it can be obtained.

TINCTURA CASTOREI COMPOSITA. Edin. *Compound Tincture of Castor.*

"Take of Russian castor powdered, *an ounce*; assafoetida, *half an ounce*; ammoniated alcohol, *one pound*. Digest for seven days, and filter through paper."

This is a more active preparation than the former, and is advantageously given in hysteria, cramp of the stomach, and flatulent colic, to the extent of $\mathfrak{f}\mathfrak{z}\mathfrak{j}$. for a dose.

TINCTURA CATECHU.² Lond. Dub. *Tincture of Catechu.*

"Take of extract of catechu, *three ounces*; cinnamon bark bruised, *two ounces*; proof spirit, *two pints*. Macerate for fourteen days, (seven days, *Dub.*) and filter."

TINCTURA CATECHU ACACIÆ. Edin. *Tincture of Catechu.*

"Take of extract of catechu in powder, *three ounces*; cinnamon bark bruised, *two ounces*; proof spirit, *two pounds and a half*. Digest for seven days, and filter through paper."

Proof spirit dissolves all the soluble parts of catechu except the mucilage, which in $\mathfrak{z}\mathfrak{i}\mathfrak{j}$ of Bengal catechu amounts to 94 grains; besides which 72 grains of impurities remain undissolved. The tincture is a solution of tannin, extractive matter,

¹ Teinture de Castor (F.) Castoreumstinktur (G.) Tintura di Castoreo (I.)

² Tinctura Japonica, P. L. 1745. Teinture de Cachou (F.) Katechutinktur (G.)

and the volatile oil of cinnamon. It is a grateful warm astringent, useful in all cases in which astringents are indicated. The dose is from f3j. to f3iij. taken in water or wine, or the cretaceous mixture of the pharmacopœias.

TINCTURA CINCHONÆ.¹ Lond. *Tincture of Cinchona.*

“Take of lance-leaved cinchona bark in powder, seven ounces; proof spirit, two pints. Macerate for fourteen days, and filter.”

TINCTURA CINCHONÆ. Edin. TINCTURA LANCIFOLIE CINCHONÆ. Dub. *Tincture of Lance-leaved Cinchona.*

“Take of cinchona bark in powder, four ounces; proof spirit, two pounds and a half, (two pints, Dub.) Digest for seven days, and filter through paper.”

Although this tincture contains the active principles of cinchona bark in considerable quantity, yet, from the nature of the vehicle, it cannot be given in sufficiently large doses to produce the beneficial effects of the bark in substance; it is therefore used chiefly as an adjunct to the infusion or decoction. The dose is from f3j. to f3iv.

TINCTURA CINCHONÆ AMMONIATA. Lond. *Ammoniated Tincture of Bark.*

“Take of lance-leaved cinchona bark powdered, four ounces; aromatic spirit of ammonia, two pints. Macerate for ten days, and filter.”

This is the formula of 1787, which was rejected without any proper reason in 1809. It is extremely useful in dyspeptic complaints attended with much acidity.

TINCTURA CINCHONÆ COMPOSITA.² Lond. Edin. Dub. *Compound Tincture of Cinchona.*

“Take of lance-leaved cinchona bark powdered, two ounces; dried orange-peel, one ounce and a half; (half an ounce, Dub.) Virginian snake-root bruised, three drachms; saffron, a drachm; cochineal in powder, two scruples; proof spirit, twenty fluid ounces. Macerate for fourteen (seven Edin.) days, and filter.”

This tincture is more grateful than the former; and although it contains less cinchona, yet the addition of the other ingredients renders it more useful both as a stomachic and a febrifuge. It is the same as the celebrated tincture of Huxham³, who generally gave it in intermittents and low nervous fevers, in diluted wine or any proper vehicle, with ten or fifteen drops of elixir of vitriol, (aromatic sulphuric acid, Edin.) The dose is from f3j. to f3iij. or more in intermittents.

¹ Tinctura corticis Peruvianæ simplex, P. L. 1745. Teinture de Quinquina (F.) Chinatinktur (G.) Tintura di China (I.)

² Zusammengesetzte Chinatinktur (G.)

³ Essay on Fever, 122.

TINCTURA CINNAMOMI.¹ Lond. Dub. TINCTURA LAURI CINNAMOMI. Edin. *Tincture of Cinnamon.*

"Take of cinnamon bark bruised, *three ounces*; (*three ounces and a half*, Dub.) proof spirit, *two pints*. Macerate for fourteen days, (*seven days*, Dub.) and filter."

This tincture contains the active principles of the bark, and is an elegant and useful adjunct to the chalk mixture and astringent infusions. The dose is from f3j. to f3iij.

TINCTURA CINNAMOMI COMPOSITA.² Lond. Dub. *Compound Tincture of Cinnamon.*

"Take of cinnamon bark bruised, *six drachms*; cardamom seeds bruised, *three drachms*; long pepper powdered, ginger-root sliced, of each, *two drachms*; proof spirit, *two pints*. Macerate for fourteen days, (*seven days*, Dub.) and filter."

TINCTURA CINNAMOMI COMPOSITA. Edin. *Compound Tincture of Cinnamon.*

"Take of cinnamon bark bruised, lesser cardamom seeds bruised, of each *one ounce*; long pepper in powder, *two drachms*; proof spirit, *two pounds and a half*. Digest for seven days, and filter through paper."

This is a much warmer aromatic than the simple tincture; and is frequently advantageously used in flatulencies, atonic gout, languors, and debility, in doses of f3j. or f3ij. properly diluted.

Official preparation. *Æther sulphuricus cum Alcohole aromaticus*. E.

TINCTURA CONII MACULATI. Edin. *Tincture of Hemlock.*

"Take of dried leaves of hemlock, *two ounces*; cardamom seeds, bruised, *half an ounce*; proof spirit, *sixteen ounces*. Digest for seven days, and filter through paper."

This is an elegant form of administering conium; and admits of its being added to mixtures. It possesses all the active properties of the plant.

TINCTURA CROCI SATIVI. Edin. TINCTURA CROCI. Dub. *Tincture of Saffron.*³

"Take of English saffron cut in shreds, *one ounce*; proof spirit, *fifteen ounces*, (*a pint*, Dub.) Digest for seven days, and filter through paper."

This tincture contains almost pure extractive, and is supposed to be stimulant and diaphoretic, but its chief value perhaps arises from its colour.

¹ Aqua Cinnamomi fortis, P. L. 1720. Teinture de Cannelle (F.) Zimmttinktur (G.) Tintura di Cinnamomo (I.)

² Tinctura aromatica, P. L. 1745.

³ Teinture de Saffron (F.)

TINCTURA DIGITALIS.¹ Lond. *Tincture of Foxglove.*

"Take of foxglove leaves dried, *four ounces*; proof spirit, *two pints*. Macerate for fourteen days, and filter."

Dublin.

"Take of foxglove leaves (the larger ones being rejected) dried and reduced to coarse powder, *two ounces*; proof spirit, *a pint*. Digest for seven days, and filter."

TINCTURA DIGITALIS PURPUREÆ. Edin. *Tincture of Foxglove.*

"Take of foxglove leaves dried, *one ounce*; proof spirit, *eight ounces*. Digest for seven days, and filter through paper."

This is a convenient form for exhibiting foxglove. It contains all the virtues of the plant, and has the advantage of preserving them unimpaired for any length of time. The dose should be m x. at first, and gradually increased, the same cautions being necessary as in the exhibition of the plant in substance.

TINCTURA GALBANI. Dub. *Tincture of Galbanum.*

"Take of galbanum cut into small pieces, *two ounces*; proof spirit, *two pints*. Digest for seven days, then filter."

It is used in the same cases as tincture of assafoetida; but, if less nauseous, it is also less powerful.

TINCTURA GALLARUM. Edin. Dub. *Tincture of Galls.*

"Take of galls in powder, *two ounces* (*four ounces*, Dub.); proof spirit, *sixteen ounces*, (*two pints*, Dub.) Macerate for seven days, then filter through paper."

Proof spirit dissolves tannin; consequently this tincture contains all the astringency of the galls, and may be employed in the same cases. The dose is from $\text{f}_{3j.}$ to $\text{f}_{3ij.}$

TINCTURA GENTIANÆ COMPOSITA.² Lond. Dub. *Compound Tincture of Gentian.*

"Take of gentian root cut, *two ounces*; orange-peel dried, *an ounce*; cardamom seeds bruised, *half an ounce*; proof spirit, *two pints*. Macerate for fourteen days, (*seven days*, Dub.) and filter."

TINCTURA GENTIANÆ COMPOSITA. Edin. *Compound Tincture of Gentian*, commonly called *Stomachic Tincture*.

"Take of yellow gentian root sliced and bruised, *two ounces*; orange-peel dried and bruised, *one ounce*; canella alba bruised, *half an ounce*; cochineal in powder, *half a drachm*; proof spirit,

¹ Teinture de Digitale (F.) Fingerhautinktur (G.) Tintura di Digitale porporina (I.)

² Tintura amara, P. L. 1745. Teinture de Gentiane composé (F.) Enziantinktur (G.) Tintura di Genziana (I.)

two pints and a half. Digest for seven days, and filter through paper.

This is an elegant stomachic bitter and cordial; but in dyspepsia, in which it is more particularly indicated, the infusion is preferable.

TINCTURA GUAIACI. Lond. Dub. *Tincture of Guaiac.*¹

"Take of guaiac powdered, *half a pound (four ounces, Dub.);* proof spirit, *two pints.* Macerate for fourteen days, (seven days, *Dub.*) and filter."

TINCTURA GUAIACI OFFICINALIS. Edin. *Tincture of Guaiac.*

"Take of guaiac, in powder, *six ounces;* alcohol, *two pounds and a half.* Digest for seven days, and filter through paper."

The difference in the proportion of the guaiac in these formulæ is much to be regretted. It is separated from the alcohol by the addition of water; and therefore when this tincture is to be given in the form of draught, it must be triturated with yolk of egg, or with mucilage, to enable it to combine with water. The dose is from fʒj. to fʒiij. in any convenient vehicle.

TINCTURA GUAIACI AMMONIATA.² Lond. Dub. Edin. *Ammoniated Tincture of Guaiacum.*

"Take of guaiac, in powder, *four ounces;* aromatic spirit of ammonia, *one pint and a half.* Macerate for fourteen days, (seven days, *Edin. Dub.*) and filter."

As the ammonia coincides with the operation of guaiac more than spirit, this tincture is more efficacious as a stimulating sudorific than the former preparation. Water decomposes it, separating the guaiac in dark curdy flakes. The dose is from fʒj. to fʒiij. triturated with any mucous or viscid matter.

TINCTURA HELEBORI NIGRI.³ Lond. *Tincture of black Hellebore.*

"Take of the root of black hellebore sliced, *four ounces;* proof spirit, *two pints.* Macerate for fourteen days, and filter."

Edinburgh. Dublin.

"Take of black hellebore-root bruised, (powdered, *Dub.*) *two ounces;* cochineal in powder, *fifteen grains;* (two scruples, *Dub.*); proof spirit, *fifteen ounces, (two pints, Dub.)* Digest for seven days, then filter through paper."

¹ Teinture de Guaiac (F.) Guajak tinktur (G.) Tintura di Guaiac (I.)

² Tinct. Guaiacina volatil. P. L. 1745. Teinture Ammoniacale de Guaiac (F.) Ammonium guajak tinktur (G.) Alcoleo Ammoniato con Guaiaco; Tintura Guajachina volatile (I.)

³ Tinctura Melampodii, P. L. 1745. Teinture d'Ellebore noir (F.) Tintura d'Elleboro (L.)

The smallness of the fibres of the root of black hellebore, which are the parts medicinally employed, renders it almost impossible to follow the direction of the London formula; and it is better to powder it coarsely, as ordered by the Dublin College. This tincture was regarded by Dr. Mead as a powerful emmenagogue, and is still ordered in uterine obstructions, and in some cutaneous affections. The dose is from $\mathfrak{m}$ xxx. to $\mathfrak{f}$ 3j. in any appropriate vehicle.

TINCTURA HUMILI. Lond. Edin. *Tincture of Hops.*

"Take of hops, *five ounces*; proof spirit, *two pints*, (*two pounds and a half*; Edin.) Macerate for fourteen days, and strain; (seven days express the tincture, and filter through paper. Edin.)"

The lightness and bulk of the hops render it difficult to make the quantity of spirit here ordered act equally on the ingredients, therefore their surface should be several times changed by stirring, during the maceration, and the tincture expressed as ordered by the Edinburgh College. The tincture is supposed to possess the tonic and narcotic properties of the plant, and has been recommended as a substitute for tincture of opium in gout and rheumatism¹, but from the experiments of Dr. Bigsby, its efficacy is very² problematical. The dose is from $\mathfrak{f}$ 3fs. to $\mathfrak{f}$ 3ij. or more.

TINCTURA HYOSCYAMI. Lond. *Tincture of Henbane.*

"Take of the dried leaves of henbane, *four ounces*; proof spirit, *two pints*. Macerate for fourteen days, and filter."

Dublin.

"Take of the dried leaves of black henbane in coarse powder, *two ounces and a quarter*; proof spirit, *a pint*. Digest for seven days; then strain."

TINCTURA HYOSCYAMI NIGRI. Edin. *Tincture of Black Henbane.*

"Take of the dried leaves of black henbane, *an ounce*; proof spirit, *eight ounces*. Digest for seven days, and filter through paper."

I have found this a more useful substitute than tincture of hops, for tincture of opium. In a dose of $\mathfrak{f}$ 3j. it seldom fails of procuring sleep and quiet; and does not affect the head, or produce costiveness. In cases of diarrhoea, when this tincture is given, it will be necessary to add a few drops of tincture of opium to counteract the tendency it has to run off by the bowels.

¹ *Freak's Observations on the Humulus Lupulus*, 9. et passim.

² *London Medical Repository*.

TINCTURA JALAPÆ. Lond.¹ *Tincture of Jalap.*

"Take of jalap-root, powdered, *eight ounces*; proof spirit, *two pints*. Digest for fourteen days, then filter."

Dublin.

"Take of jalap-root in coarse powder, *five ounces*; proof spirit, *two pints*. Digest for seven days, then filter."

TINCTURA CONVULVULI JALAPÆ. Edin. *Tincture of Jalap.*

"Take of jalap-root in powder, *three ounces*; proof spirit, *fifteen ounces*. Digest for seven days, and filter through paper."

Both water and alcohol separately extract part of the active principles of jalap, and proof spirit the whole of them; the combination of the gum, extractive, and resin of the root being requisite for the production of its full cathartic effect. The great difference in point of strength of these tinctures is much to be regretted.

TINCTURA KINO. Lond. *Tincture of Kino.*²

"Take of kino in powder, *three ounces*; proof spirit, *two pints*. Macerate for fourteen days, and strain."

Edinburgh. Dublin.

"Take of kino, *two ounces*; (*three ounces, Dub.*) proof spirit, *a pint and a half*. Digest for seven days, and filter through paper."

The matter in solution in this tincture is chiefly tannin. It is administered in chronic diarrhœa, the latter stage of dysentery, fluor albus, and in all cases in which astringents are indicated; but it is less certain in its operation than the tincture of catechu. The dose is from $\text{f}\frac{3}{4}$ j. to $\text{f}\frac{5}{4}$ j.

TINCTURA LYTTE. Lond. *Tincture of blistering Fly.*³

"Take of blistering flies bruised, *three drachms*; proof spirit, *two pints*. Macerate for fourteen days, and filter."

TINCTURA CANTHARIDES VESCICATORIÆ. Edin. *Tincture of Blistering Fly.*

"Take of blistering flies bruised, *a drachm*; proof spirit, *a pound*. Digest for seven days, and filter through paper."

TINCTURA CANTHARIDIS. Dub. *Tincture of Blistering Fly.*

"Take of blistering flies in powder, *two drachms*; cochineal in powder, *half a drachm*; proof spirit, *a pound and a half*. Digest for seven days, then strain."

Proof spirit extracts the active matter of the flies, and is a more convenient form for exhibiting it internally than in substance.

This tincture is useful in gleet, fluor albus, incontinence of

¹ Tinctura Jalapæ, P. L. 1745, 1787.

² Teinture de Kino (F.)

³ Tinct. Cantharidis, P. L. 1787. Teinture de Cantharides (F.) Cantharidentinktur (G.) Tintura di Cantaridi (I.)

urine, and in some cutaneous eruptions. The dose is from ℥ x. to fʒj. given in some demulcent infusion. As an external application it is efficaciously employed, in conjunction with soap or camphor liniment, as an embrocation against rheumatic pains; and I have found that a rag moistened with it is an useful application in that peculiar species of mortification of the extremities, which sometimes happens without any apparent cause; and to frost-bitten parts.

TINCTURA MOSCHI. Dub. *Tincture of Musk.*¹

“Take of musk in powder, two drachms; rectified spirit, a pint. Digest for seven days, then strain.”

The only effectual form in which musk can be exhibited is in powder; much larger doses of it being requisite to do any good than can be given in a spirituous vehicle.

TINCTURA MYRRHÆ. Lond.² *Tincture of Myrrh.*

“Take of myrrh, bruised, four ounces; rectified spirit, two pints; water, a pint. Macerate for fourteen days, and filter.”
Edinburgh.

“Take of myrrh in powder, three ounces; alcohol, twenty ounces; water, ten ounces. Digest for seven days, and filter through paper.”

Dublin.

“Take of myrrh bruised, three ounces; proof spirit, a pint and a half; rectified spirit, half a pint. Digest for seven days, then strain.”

A transparent tincture of a golden yellow colour may be prepared by treating myrrh with alcohol alone; but, by following the directions of the colleges, a rather turbid tincture is obtained; a circumstance which, *à priori*, might have been suspected. This tincture is tonic and deobstruent; but it is more generally used in gargles, combined with infusion of roses and acids; or as an application to foul ulcers, and exfoliating bones; or diluted with water, as a wash for the mouth when the gums are spongy. The dose is from fʒss. to fʒj.

TINCTURA OPII. Lond. *Tincture of Opium.*³

“Take of hard opium, powdered, two ounces and a half; proof spirit, two pints. Macerate for fourteen days, and strain.”

TINCTURA OPII, sive THEBAICA; vulgo, LAUDANUM LIQUIDUM. Edin. *Tincture of Opium, or Thebaic Tincture; commonly, Liquid Laudanum.*

¹ Teinture de Muse (F.) Tintura di Muschio (I.)

² Tinct. Myrrhæ simplex, P. L. 1720. Teinture de Myrrhe (F.) Myrrhentinktur (G.) Tintura di Mirra (I.)

³ Teinture d'opium (F.) Opiums-tinktur (G.) Laudano liquido; Alcoole opiato (I.)

"Take of opium, *two ounces*; proof spirit, *two pounds*. Macerate for seven days, and filter through paper."

TINCTURA OPII, sive TINCTURA THEBAICA. Dub. *Tincture of Opium, or Thebaic Tincture.*

"Take of purified hard opium in coarse powder, *ten drachms*; proof spirit, *a pint*. Digest for seven days, then strain."

Owing to crude opium being now ordered by the London College instead of hard purified opium, the strength of the tincture formerly prepared is to that of the present tincture, as 3 to 2; or $\mathfrak{m}$ xiv. of the old tincture contained one grain of opium, and were equal to $\mathfrak{m}$ xix. of the present tincture. The Edinburgh tincture is of the same strength as the present London tincture; but the Dublin is stronger, $\mathfrak{m}$ xiv. of it containing one grain of opium. This tincture is used in all cases in which opium is indicated, and is a very convenient and elegant form of giving the remedy.¹ The usual dose is from $\mathfrak{m}$ x. to $\mathfrak{m}$ lx.; but in some morbid states of the habit very large doses can be borne, and are even necessary. In colica pictonum $\mathfrak{f}$ 3j. given before using purges, facilitates their action, and renders the relief more speedy; and in tetanus $\mathfrak{f}$ 3vss. have been given in divided doses, with advantage in twenty-six hours. As an external application, the tincture rubbed upon the skin produces its anodyne effects in a smaller degree, allays local pains, and assists in relaxing the spasm in lock-jaw and similar affections. Its powers as an external remedy are very much increased by combining it with vinegar; an acetate of morphia being thus produced.

TINCTURA OPII AMMONIATA; olim, ELIXIR PAREGORICUM. Edin. *Ammoniated Tincture of Opium*; formerly *Paregoric Elixir.*

"Take of opium, *two drachms*; benzoic acid, saffron, cut in shreds, of each, *three drachms*; volatile oil of aniseed, *half a drachm*; ammoniated alcohol, *sixteen ounces*. Digest for seven days, and filter through paper."

This tincture is useful in whooping-cough and spasmodic asthma. Each $\mathfrak{f}$ 3j. contains gr. j. of opium.

TINCTURA QUASSIÆ EXCELSÆ. Edin. *Tincture of Quassia.*²

"Take of quassia wood rasped, *one ounce*; proof spirit, *two pounds and a half*. Digest for seven days, and filter through paper."

TINCTURA QUASSIÆ. Dub. *Tincture of Quassia.*

¹ It ought to be kept in opaque bottles; as light, according to the experiments of Vogel, has the power of decomposing it. Vide Journ. Pharm. Maii. 1815. p. 199.

² Currie's Report on Cold Water, i. 138.

³ Teinture de Quassia (F.)

"Take of chips of quassia wood, *an ounce*; proof spirit, *two pints*. Digest for seven days, then strain."

This tincture contains the bitter of the wood in perfection, and may be used in the same cases as the infusion.

TINCTURA RHEI.¹ Lond. *Tincture of Rhubarb.*

"Take of rhubarb root sliced, *two ounces*; cardamom seeds bruised, *an ounce and a half*; saffron, *two drachms*; proof spirit, *two pints*. Macerate for fourteen days in a gentle heat, and filter."

Dublin.

"Take of rhubarb root sliced, *two ounces*; lesser cardamom seeds husked and bruised, liquorice bruised, of each, *half an ounce*; saffron, *two drachms*; proof spirit, *two pints*. Digest for seven days, then filter."

TINCTURA RHEI. Edin. *Tincture of Rhubarb.*

"Take of rhubarb root sliced, *three ounces*; lesser cardamom seeds bruised, *half an ounce*; proof spirit, *two pounds and a half*. Digest for seven days, and filter through paper."

TINCTURA RHEI COMPOSITA.² Lond. *Compound Tincture of Rhubarb.*

"Take of rhubarb root sliced, *two ounces*; liquorice root bruised, *half an ounce*; ginger root sliced, saffron, of each, *two drachms*; proof spirit, *a pint*; water, *twelve fluid ounces*. Macerate for fourteen days in a gentle heat, and filter."

TINCTURA RHEI ET ALOES. Edin. *Tincture of Rhubarb and Aloes*; formerly, *Sacred Elixir*.³

"Take of rhubarb root, sliced, *ten drachms*; Socotorine aloes powdered, *six drachms*; lesser cardamom seeds bruised, *half an ounce*; proof spirit, *two pounds and a half*. Digest for seven days, and filter through paper."

TINCTURA RHEI ET GENTIANÆ. Edin. *Tincture of Rhubarb and Gentian.*

"Take of rhubarb root sliced, *two ounces*; gentian root, sliced, *half an ounce*; proof spirit, *two pounds and a half*. Digest for seven days, and filter through paper."

All these tinctures of rhubarb are purgative and stomachic; but the strength of the menstruum is too great to permit of their general use for the first intention, and they are more usually employed as adjuncts to saline purgatives, to give them warmth, or to stomachic infusions in dyspepsia, flatulent colic, diarrhoea, the costiveness of old people, and of those of cold

¹ Tinctura Rhabarbari, P. L. 1720. 1787. Teinture de Rhubarbe (F.) Rhabarbertinktur (G.) Tinctura de Rhabarbaro (I.)

² Rhabarbari composita, P. L. 1787.

³ Alcohol avec Aloë et Rhubarbe (F.) Alcoole Aloë-Rabarbarato (I.)

phlegmatic habits. The dose to operate as a purgative is fʒvj. and from fʒj. to fʒiij. to produce stomachic effects.

TINCTURA SCILLÆ. Lond. Edin. Dub. *Tincture of Squills.*

"Take of recent squill root (bulb) dried, *four ounces*, (two ounces, Edin.); proof spirit, *two pints*, (sixteen ounces, Edin.) Macerate for fourteen days, and filter." (Digest for seven days, then set it aside until the dregs are subsided, and pour off the clear liquor. *Dub.*)

Proof spirit takes up the active principles of the squill, and affords a convenient form of exhibiting it in all the cases in which it is indicated. The dose is from ℥x. to ℥xxx. given in almond mixture, ammoniac mixture, or mucilage.

TINCTURA SENNÆ. Lond. *Tincture of Senna.*¹

"Take of senna leaves, *three ounces*; caraway seeds bruised, *three drachms*; cardamom seeds bruised, *a drachm*; raisins stoned, *four ounces*; proof spirit, *two pints*. Macerate for fourteen days in a gentle heat, and filter."

Dublin.

"Take of senna leaves, *a pound*; caraway seeds bruised, *one ounce and a half*; lesser cardamom seeds husked and bruised, *half an ounce*; proof spirit, *a gallon*. Digest for fourteen days, then filter."

TINCTURA SENNÆ COMPOSITA. Edin. *Compound Tincture of Senna.*

"Take of the leaves of senna, *two ounces*; jalap root bruised, *one ounce*; coriander seeds bruised, *half an ounce*; proof spirit, *three pounds and a half*. Digest for seven days, and to the filtered tincture add of refined sugar *four ounces*."

These tinctures are stomachic and purgative. They are very efficacious in flatulent colic, atonic gout, and as an opening medicine for those whose bowels have been weakened by intemperance. The dose is from fʒij. to fʒj. in any appropriate vehicle.

TINCTURA SERPENTARIÆ. Lond. Dub. *Tincture of Snake Root.*

"Take of snake root, (cut and bruised, *Dub.*) *three ounces*; proof spirit, *two pints*. Macerate for fourteen days, (seven days, *Dub.*) and filter."

TINCTURA ARISTOLOCHIÆ SERPENTARIÆ. Edin. *Tincture of Snake Root.*

"Take of snake root, bruised, *two ounces*; cochineal in powder, *a drachm*; proof spirit, *two pounds and a half*. Digest for seven days, and filter through paper."

¹ Elixir Salutis, P. L. 1720.

This tincture is a useful addition to infusion of cinchona bark, in typhoid and putrid fevers, gout, and periodic head-ach. The dose is from $f\frac{3}{4}$ ss. to $f\frac{3}{4}$ ij.; or, when taken in water, as much as can be taken without the operation of the spirit proving hurtful.

TINCTURA TOLUIFERÆ BALSAMI. Edin. *Tincture of Balsam of Tolu.*

“Take of balsam of Tolu, *an ounce and a half*; alcohol, *a pound*. Digest until the balsam is dissolved, and filter through paper.”

Tincture of balsam of Tolu is scarcely ever used except on account of its agreeable flavour. As it is decomposed by water, it is necessary to triturate it with mucilage, in order to mix it with any aqueous fluid. It is chiefly used for making the syrup.

Official preparation. *Syrupus Toluiferæ Balsami.* E.

TINCTURA VALERIANÆ. Lond. Dub. *Tincture of Valerian.*

“Take of valerian root in powder, *four ounces*; proof spirit, *two pints*. Macerate for fourteen days, (seven days, *Dub.*) and filter.”

Proof spirit extracts the active matter of the valerian, but the tincture cannot be given in doses sufficiently large to prove very efficacious.

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 filter.”

Dublin.

“Take of valerian root in powder, *two ounces*; spirit of ammonia, *a pint*. Digest for seven days, then filter.”

As the ammonia corresponds in virtue with the valerian, this tincture is more powerful than the foregoing. It is advantageously employed in hysteria and other nervous affections, in doses of $f\frac{3}{4}$ j. or $f\frac{3}{4}$ ij. given in milk, or some other bland fluid.

TINCTURA VERATRI ALBI. Edin. *Tincture of white Hellebore.*

“Take of white hellebore root, bruised, *eight ounces*; proof spirit, *one pound and a half*. Digest for seven days, and filter through paper.”

This tincture is sometimes employed to excite vomiting in

* Teinture de Valeriane (F.) Baldrian tinktur (G.) Tintura di Valeriana (I.)

* Tinctura Valerianæ volatilis, P. L. 1745. Baldriantinktur mit Ammonium liquor (G.)

maniacal and apoplectic cases; and as an alterative in cutaneous eruptions. It is given in doses of $\mathfrak{m}$ v. to $\mathfrak{m}$ x. but it is a very unmanageable remedy, producing sometimes the most violent effects.

TINCTURA ZINGIBERIS. Lond. Dub. TINCTURA AMOMI ZINGIBERIS. Edin. *Tincture of Ginger.*

"Take of ginger root sliced, *two ounces*; proof spirit, *two pints*. Macerate for fourteen days, (seven days, *Dub. Edin.*) and filter."

This tincture possesses all the pungency of the ginger, and is useful as a stimulant and carminative, in atonic gout, when it attacks the stomach, in flatulent colic, and as a corrigent to griping purgatives.

ÆTHEREA.

PREPARATIONS OF ETHER.

THE action of the strong acids on alcohol produces an order of compounds, which possess both important chemical properties, and medicinal virtues. These are named ETHERS, and agree in certain general properties, but vary in some of their qualities according as they are produced from different acids. They are all extremely volatile, and require to be preserved in closely stoppt phials.¹ The following are medicinally used.

ÆTHER SULPHURICUS. Lond. *Sulphuric Ether.*²

"Take of rectified spirit, sulphuric acid, of each, *one pound and a half*. Pour the spirit into a glass retort, and add the acid gradually to it, shaking it frequently, and taking care that the temperature of the mixture do not exceed 120° , until it be completed. Then cautiously place the retort in a sand-bath, previously heated to 200° , that the liquor may boil as quickly as possible, and the ether pass into a tubulated receiver to which another receiver is adapted, which is to be cooled by ice or water. Distil until a heavier fluid begins to pass over, which is seen in the bottom of the receiver below the ether. Pour on the liquor which remains in the retort twelve fluid ounces more of rectified spirit, and distil another portion of ether in a similar manner."

¹ The phial proposed by Dr. Dewar is the best for this purpose. It consists of a stoppt phial, having a circular rim round its shoulder, not rising quite so high as the mouth of the bottle, and a glass cup with a heavy bottom, which when inverted over the mouth of the phial into mercury, poured into the rim, hermetically closes it. *Annals of Phil.* vol. x. p. 20.

² Ether (F.) Schwefelätther (G.) Etere (I.)

Edinburgh.

"Take of sulphuric acid, alcohol, of each, *thirty-two ounces*. Pour the alcohol into a glass retort, capable of sustaining a sudden heat; then pour the acid on it in an uninterrupted stream. Mix them gradually by frequent and gentle agitation; then immediately distil from a sand-bath, previously heated for the purpose, into a receiver kept cold with water or snow. Let the fire be so regulated that the fluid may boil as soon as possible, and continue to boil until sixteen ounces shall have distilled over; then let the retort be removed from the sand-bath.

"To the distilled liquor, add two drachms of potash; then distil again from a high retort, with a very gentle heat, into a receiver kept cold, until ten ounces have passed over.

"If sixteen ounces of alcohol be added to the residuary acid after the first distillation, and the distillation repeated, ether will be reproduced. And this may be often repeated."

*ÆTHER RECTIFICATUS. Lond. Rectified Ether.*¹

"Take of sulphuric ether, *fourteen fluid ounces*; fused potash, *half an ounce*; distilled water, *two fluid ounces*. First dissolve the potash in the water, and add the ether to it, shaking them well together, until they be mixed; lastly, in a heat of 120°, distil from a large retort into a cold receiver twelve fluid ounces of rectified ether."

ÆTHER SULPHURICUS. Dub. Sulphuric Ether.

"Take of sulphuric ethereal liquor, *twenty fluid ounces*; sub-carbonate of kali dried and in powder, *two drachms*. Mix them, and distil from a high retort by means of a very gentle heat, into a receiver kept cold, twelve fluid ounces. The specific gravity of this fluid is to that of distilled water, as 765 to 1000."

The admixture of alcohol and sulphuric acid produces an almost instantaneous formation of ether, which is made sensible by the odour of the mixture; while by the mutual action of the spirit and the acid on each other a considerable evolution of caloric takes place, and the temperature of the mixture is raised to 180°. Whatever can encourage these effects in the first instance is to be avoided, as by the sudden rise of temperature, and the disengagement of ethereal vapours before the apparatus be adjusted, not only is the retort in danger of being broken, but a considerable waste of product also takes place. The directions of the Dublin College, therefore, to heat the spirit before pouring on the acid, are evidently improper; and the least objectionable mode for forming the mixture is undoubtedly that of the London College, if the retort be cooled

¹ Ether vitriolicus, P. L. 1787.

after the addition of each portion of the acid. The retort should be thin, and the sand-bath previously heated to 208° , so that the liquor may boil immediately; for the ether is formed, and distils over at this temperature: whereas, by gradually raising the heat to this point, part of the alcohol comes over unaltered. The ether, as it distils, is condensed in the cool receivers, in the form of a colourless, limpid, transparent fluid; but towards the end of the operation a white vapour also comes over, on the appearance of which the distillation should be stopt. The receivers ought to be ample, and kept cool with ice or snow, or cold water, which we have found to be preferable to ice or snow. The best mode of applying it is to lay narrow shreds of woollen cloth over the receivers, with one end of each immersed in a vessel of cold water placed higher than the receivers, by which means the water is made to trickle constantly over them; and, by the evaporation which it suffers, the receivers are kept in a sufficiently low temperature, and at the same time, the nature of their contents is distinctly seen, which cannot be conveniently done when they are immersed in snow or ice, or even water. The luting which answers best in this operation is common paste, spread on slips of cloth, first applied, and then surrounded with pieces of wet bladder.

The product of the first distillation, is sulphuric ether combined with water, some alcohol, and a small portion of sulphureous acid, forming an impure ether of the specific gravity $\cdot 768$; and that of the second distillation, or after the addition of a new portion of alcohol, is a similar ether of the specific gravity $\cdot 807$: on mixing these, a fluid of the specific gravity $\cdot 788$ is obtained, which is the unrectified ether of the present London Pharmacopœia.¹ By the rectification of this ether according to the directions of the British Colleges, it is deprived of the sulphureous acid and nearly all the water, and its specific gravity reduced to $\cdot 732$, or when highly rectified to $\cdot 725$; but it still contains some water and alcohol, as ether of a specific gravity so low as $\cdot 632$ in the temperature of 60° has been² obtained. The use of the alkali in the rectification is, by its affinity for the acid and the water, to separate and detain these; and this is still more completely accomplished by the addition of a portion of black oxide of manganese, which, by affording oxygen to

¹ *London Medical Review*, April 1810, p. 163.

² Lowitz procured ether of this gravity by the following process. To ether reduced to $\cdot 746$ specific gravity by means of subcarbonate of potash in the usual method, he added as much dry powdered muriate of lime as it would dissolve. On standing, the mixture separated into two parts; the alcohol holding the salt in solution sunk to the bottom; the ether swam on the surface. When separated from the inferior liquor, its specific gravity was now only $\cdot 632$ in the temperature of 60° . *Thomson's Chemistry*, 4th ed. ii. 443.

the sulphureous acid, converts it into sulphuric acid, and thus renders it perfectly fixed at the temperature employed.

The theory of the formation of ether is still unsettled. It has been contended, that the balance of affinities between the constituents of the alcohol is broken by the acid, the oxygen of which attracting a portion of the hydrogen of the alcohol forms water; while a portion of its carbon, at the same time set free, forms the residuary black matter found in the retort; and, by a new combination of the remaining hydrogen, carbon, and oxygen, the ether is produced. This explanation, however, which supposes a partial decomposition of the acid, has been denied by Fourcroy and Vauquelin, who, from a series of very ingenious experiments¹, concluded, that the acid suffers no decomposition, except towards the end of the process, which is to be attributed to the carbonaceous matter collected in the retort; but that it produces the decomposition of the alcohol without being itself decomposed, by the exertion alone of a disposing affinity. The ether, according to them, is the result of the new combination of the components of the alcohol, part of its oxygen and hydrogen first combining to form water, and a large portion of its carbon being separated without entering into any new combination; so that ether differs from alcohol only in containing a greater proportion of hydrogen and oxygen, and a smaller proportion of carbon. Several objections have been raised to this theory; but, as in a work of this nature it is not necessary to enter minutely into theoretical discussions, I shall only observe, that the most probable opinion is, that the sulphuric acid acts merely by abstracting water from the alcohol, neither transferring any thing to, nor further decomposing it; or, that ether is merely alcohol deprived of one half its water. The sulphureous and carbonic acids, and the charry residue formed in the process, are produced by the decomposition of a portion of the alcohol, by the acid; but this decomposition is not essential for the formation of ether. According to the experiments on which this opinion is founded, alcohol consists of 100 of olefiant gas and 50 of water. Ether consists of 100 parts of olefiant gas and 25 of water. According to Saussure, jun. the ultimate components of 100 parts of ether are, 67.98 of carbon, 14.40 of hydrogen, and 17.62 of oxygen.

Qualities.—Ether has a fragrant penetrating odour, and a hot pungent taste. It is colourless and perfectly limpid; and is the most volatile of liquids, drying immediately if poured on the hand, and producing a great degree of cold by its evaporation. It boils in the open air at 98°, and in vacuo at a temperature considerably below the common freezing point;

¹ *Annales de Chimie*, xxiii. 203.

and, but for the pressure of the atmosphere, would always be in a gaseous form. When cooled down to -46° , ether congeals in brilliant transparent plates. It is extremely inflammable, taking fire on the approach of any ignited body, a circumstance which requires to be attended to in pouring it from one phial to another by candle-light. During its combustion carbonic acid is formed, and traces of charcoal are left behind. It unites with alcohol in every proportion, and also readily mixes with ammonia; but ten parts of water take up only one of ether. It dissolves volatile oils, bitumens, camphor, extractive, and resins. It is decomposed by sulphuric acid.

Medical properties and uses. — Sulphuric ether is stimulant, narcotic, and antispasmodic. In its operation it resembles alcohol, but is more diffusible, and its effects are less permanent. It is beneficially employed as a cordial in typhoid and low fevers, particularly when nausea, subsultus tendinum, and other spasmodic symptoms are present. As an antispasmodic, it relieves the paroxysm of spasmodic asthma, whether it be taken into the stomach, or its vapour only be inhaled into the lungs; in which latter form it is also useful in simple dyspnoea and in catarrh. Much caution, however, is required in inhaling the vapour of ether, as the imprudent inspiration of it has produced lethargic and apoplectic symptoms. It is employed with advantage in hysteria, tetanus, cramp of the stomach, hiccough, and in cholera morbus, to check the vomiting; and also allays the violence of sea-sickness. The usual dose of sulphuric ether is from f₃ss. to f₃ij.; but it has been given in much larger doses with the most beneficial effects; and in all cases the dose must be repeated at short intervals to produce the full effect of the remedy. As an external application, ether acts either as a stimulant or a refrigerant, according to the mode in which it is applied. The first takes place when it is prevented from evaporating, by being confined over the spot to which it is applied; in which case it often proves useful in relieving head-ach and other muscular pains: and from its refrigerant effect produced by its rapid evaporation, it is applied to burns, and to assist in the reduction of strangulated hernia. We have seen it produce almost immediate relief in ear-ach, when dropped into the external meatus.

Official preparation. *Spiritus Aetheris sulphurici.* L.

OLEUM ÆTHEREUM. Lond. *Ethereal Oil.*¹

After the distillation of sulphuric ether, distil again the remaining liquor with a gentle heat, until a black froth swells up; then immediately remove the retort from the fire. To

¹ Oleum Vini, P. L. 1787. Huile douce de vin (F.) Oleo dolce di Vino (I.)

the liquor in the retort add water sufficient that the oily part may float upon it. Let this be skimmed off, and as much lime-water be added to it as will neutralize any acid it may contain; and shake them together. Lastly, take off the ethereal oil after it has separated."

LIQUOR ÆTHEREUS OLEOSUS. Dub. *Oily Ethereal Liquor.*

"Take what remains in the retort after the distillation of sulphuric ether. Distil to one half, by a moderate heat."

The product of both of these processes is a thick oily matter, of a yellow colour, less volatile than ether, soluble both in ether and alcohol; but insoluble in water. Its nature is not clearly ascertained: for, although Fourcroy and Vauquelin consider it as similar to ether, and differing from it principally in containing a larger proportion of carbon; yet other chemists maintain that it is merely a compound of ether and sulphureous acid: but with regard to either of these opinions, it is still necessary to suspend our judgment. It can be obtained more directly, although less economically, by distilling ether with a portion of sulphuric acid. It is used only for the preparation of the compound spirit.

Official preparation. *Spiritus Ætheris compositus.* L. D.

SPIRITUS ÆTHERIS AROMATICUS. Lond. *Aromatic Spirit of Ether.*¹

"Take of cinnamon bark bruised, *three drachms*; cardamom seeds powdered, *a drachm and a half*; long pepper powdered, ginger-root sliced, of each, *a drachm*; spirit of sulphuric ether, *a pint*. Macerate for fourteen days in a stopped glass bottle, and strain."

ÆTHER SULPHURICUS CUM ALCOHOLE AROMATICUS. Edin. *Aromatic Sulphuric Ether with Alcohol.*

"Take of cinnamon bark bruised, cardamom seeds bruised, each *an ounce*; long pepper bruised, *two drachms*; sulphuric ether with alcohol, *two pounds and a half*. Digest for seven days, and filter through paper."

These preparations do not differ in their medicinal properties from the former; the aromatics rendering them only a little more grateful.

*SPIRITUS ÆTHERIS NITRICI.*² Lond. *Spirit of Nitric Ether.*

"Take of rectified spirit, *two pints*; nitric acid (by weight), *three ounces*. Add the acid gradually to the spirit, and mix them, taking care that the temperature, during the mixture,

¹ Elixir Vitrioli dulce, P. L. 1745.

² Spiritus Nitri dulcis, P. L. 1745. Spir. Ætheris nitrosi, P. L. 1767. Alcool éthereux par l'acide nitrique (F.) Atherischer salpeterspiritus (G.) Spirito di nitro dolce (I.)

does not exceed 120° ; then distil, by a gentle heat, twenty-four fluid ounces."

SPIRITUS ÆTHERIS NITROSI. Edin. *Spirit of Nitrous Ether.*

"Take of alcohol, *three pounds*; nitrous acid, *one pound*; pour the alcohol into a large phial placed in a vessel full of cold water, and add the acid gradually, with frequent agitation. Let the phial be slightly corked, and placed in a cool place for seven days; then distil the liquor by the heat of boiling water, into a receiver kept cool with snow or water, as long as any spirit comes over."

SPIRITUS ÆTHEREUS NITROSUS. Dub. *Nitrous Ethereal Spirit.*

"Add to the matter which remains after the distillation of nitrous ether, the rectified spirit of wine, employed in that operation for condensing the elastic vapour, and distil to dryness, with the greater heat of a water-bath. Mix the distilled liquor with the alkaline liquor which remains after the separation of the nitrous ether, and also add as much dry subcarbonate of kali as shall be sufficient to saturate the predominant acid; which is to be determined by the test of litmus. Lastly, distil by the medium heat of a water-bath, as long as any fluid comes over. The specific gravity of this liquor is to that of distilled water, as 850 to 1000."

The products of the London and Edinburgh processes are in every respect the same; but the former is to be preferred on account of the length of time required by the latter. The small quantity of acid in proportion to the alcohol employed permits the mixture to be effected without any violent action taking place, or the evolution of much heat, provided the acid be added in small quantities and at intervals, and each portion be thoroughly mixed with the alcohol before another be added. The heat employed for the distillation should not exceed 212° , and it should be stopped as soon as twenty-four fluid ounces come over; for when it is longer continued the product becomes coloured, and contains too much free acid.¹ The theory of the operation, inasmuch as relates to the production of the nitric ether, which is thus obtained in combination with a large proportion of unchanged alcohol and a small proportion of nitric acid, is the same as that already detailed; and the entire product has the same relation to nitric ether as spirit of sulphuric ether has to sulphuric ether.

The product obtained by the first part of the Dublin process is analogous to the above. The acid which the residue of the

¹ *London Medical Review*, April 1810, p. 154.

distillation of nitrous ether contains, and the alcohol already impregnated with a small portion of that fluid, when mixed and heated, act reciprocally on each other, and a compound of nitric ether, unchanged alcohol, and free acid, distils over; but the alkali, with which it is mixed before the second distillation, removing the acid, its properties, both as a chemical compound and as a remedy, must be necessarily altered. The products of the former processes are those which have been longest known and most extensively employed.

Qualities. — Spirit of nitric ether, as procured by the London or the Edinburgh process, has an extremely fragrant odour, and a pungent acidulous taste. It is very volatile and inflammable; soluble in water and in alcohol; and strikes a deep olive with solution of green sulphate of iron.

Medical properties and uses. — Spirit of nitric ether is refrigerant, diuretic, and antispasmodic. It has long been employed under the title of *Sweet Spirit of Nitre*, as a grateful refrigerant, and to quench thirst in febrile affections; for which purpose the dose is from ℥xx. to ℥xl. given in a cupful of water, or any other appropriate vehicle. In larger doses it acts as a gentle stimulant to the stomach, relieving nausea and flatulence; and also determines to the kidneys, increasing the flow of urine; on which account it is advantageously prescribed as an auxiliary to other diuretics in dropsical complaints.

SPIRITUS ÆTHERIS SULPHURICI. Lond. *Spirit of Sulphuric Ether.*

“Take of sulphuric ether, *half a pint*; rectified spirit, *a pint*. Mix them.”

ÆTHER SULPHURICUS CUM ALCOHOLE. Edin. *Sulphuric Ether with Alcohol.*

“Take of sulphuric ether, *one part*; alcohol, *two parts*. Mix them.”

LIQUOR ÆTHEREUS SULPHURICUS. Dub. *Sulphuric ethereal Liquor.*

“Take of rectified spirit of wine, sulphuric ether, of each, *thirty-two ounces*. Let the spirit heated to 120° be poured into a glass retort fit to bear a sudden heat, and add the acid in an uninterrupted stream; let them be gradually mixed, and by means of a quick and sufficiently powerful heat, distil twenty ounces of the liquor into a receiver kept cool.

“If sixteen ounces of rectified spirit of wine be poured on the residuary acid in the retort, more sulphuric ethereal liquor will be obtained by repeating the distillation.”

In the old method of preparing this spirit by distilling the charge for sulphuric ether by a slow and gradually increased heat, an alcoholized ether was obtained, owing to part of the

alcohol first passing over unaltered before the ether was formed, the specific gravity of which was $\cdot 768$; but the gravity of the above mixture is $\cdot 816$, showing that it contains considerably less ether in combination with the alcohol.

Medical properties and uses.—It may be used for the same purposes as the ether; but it is necessarily much less active. The dose is from $\text{f}\text{3j}$. to $\text{f}\text{3ij}$. An useful gargle for slight inflammation of the fauces is prepared by adding $\text{f}\text{3j}$. of this spirit to $\text{f}\text{3vj}$. of barley-water, sweetened with $\text{f}\text{3iv}$. of syrup of marsh-mallows.

SPIRITUS ÆTHERIS SULPHURICI COMPOSITUS. Lond. *Compound Spirit of Ether.*

“Take of spirit of sulphuric ether, a pint; ethereal oil, two fluid drachms. Mix them.”

This is intended as a substitute for the *Anodyne Liquor of Hoffmann*; and, besides being stimulant and antispasmodic, it is supposed to possess anodyne properties. It is an useful addition to tincture of opium, when given with the intention of procuring sleep; and often prevents the opium from exciting the nausea which it is apt to produce in some habits. The dose is from $\text{f}\text{3fs}$. to $\text{f}\text{3ij}$. in any appropriate vehicle.

ÆTHER NITROSUS. Dub. *Nitrous Ether.*

“Take of nitrate of kali, dried and coarsely powdered, a pound and a half; sulphuric acid, a pound; rectified spirit of wine, nineteen fluid ounces. Put the nitrate of kali into a tubulated retort, placed in a bath of cold water, and pour upon it in small quantities, and at intervals, the sulphuric acid and the spirit previously mixed together, and allow the mixture to become cold. Without any external heat, or at least a very gentle one, (such as may be communicated by the addition of a little tepid water to the bath,) an ethereal liquor will begin to distil. In a short time the heat of the retort will spontaneously increase, and a considerable ebullition take place, which must be moderated by adding some cold water to the bath. The receiver must also be kept cool with water or snow, and furnished with a proper apparatus for transmitting the very elastic vapour (arising from the mixture with great force if the heat be too much increased) through a pound of rectified spirit of wine in a phial which is to be kept cold.

“The ethereal liquor, thus spontaneously distilled, is to be put into a glass phial, fitted with a ground glass stopper, and as much subcarbonate of kali, dried, and in powder, is to be added as is necessary to neutralize the acid, closing the phial after each addition of the kali, and determining the neu-

¹ Alcool éthereux par l'acide sulphurique (F.) Atherischer Schwefeleigent Liquor (G.) Anodino minerale dell' Hoffmann (L.)

tralization by the test of litmus: about a drachm of salt is generally sufficient for this purpose; and in a short time the nitrous ether will rise to the surface, and is to be separated by means of a funnel.

"If the ether is required to be very pure, distil it again from a water-bath, at a temperature of 140° , to one half. Its specific gravity is to that of distilled water, as 900 to 1000."

The action of nitric acid on alcohol is so violent, that the formation of ether which it affords, has always been regarded as a process of great difficulty, to obviate which many ingenious plans have been suggested. The operation which has been just described is admirably adapted for procuring it with facility and safety. It was contrived by Woulfe, and was found by Pelletier to succeed better than any other. The sulphuric acid and the spirit must be mixed with the same degree of caution as is necessary in preparing sulphuric ether; and the receiver must be larger, and kept perfectly cool, with the apparatus, described in the formulæ, attached to it, which should be kept cool by a mixture of snow or ice and muriate of lime.

In the above process, the nitrate of potash is first decomposed, and nitric acid formed, which acts upon the alcohol as it evolves. The theory of this action is very obscure: but from a number of well contrived experiments Thenard was led to draw the following conclusions. Both the acid and the alcohol are decomposed; the oxygen of the former combines with a large proportion of the hydrogen, and a small quantity of the carbon of the alcohol, and thence result, "1st, Much water and nitrous oxide, and small quantities of carbonic acid, nitrous acid, and nitric oxide. 2dly, The separation of a small quantity of nitrogen, and the formation of much nitric ether by the combination in large quantity of the two elements of the nitric acid, with the alcohol from which the large proportion of hydrogen and small proportion of carbon have been abstracted. 3dly, The formation of acetic acid, and of a matter disposed to pass to the state of charcoal, by the combination, in certain proportions, of the hydrogen and carbon of the alcohol with the oxygen of the nitric acid."

Qualities.—Nitrous, or rather nitric ether has a strong ethereal odour, but is less fragrant than sulphuric ether. Its taste is strong and peculiar; and its colour slightly yellow, probably arising from the presence of a small portion of nitric oxide. When highly rectified, its specific gravity is 0.866¹: it is more volatile than sulphuric ether, boiling at a tempera-

¹ Murray's Chemistry, 2d ed. iv. 447.

² Duncan, New Edinburgh Dispensatory, 5th ed. 567.

ture of 70° , and consequently producing a greater degree of cold by its evaporation; and is very inflammable. It requires 48 parts of water for its solution, but combines with alcohol in every proportion; and readily absorbs nitrous and acetic acids, both of which acids are formed in it when it is kept for some time. According to the analysis of Thenard, the constituents of 100 parts of nitric ether are 48.52 of oxygen, 28.45 of carbon, 14.49 of azote, and 8.54 of hydrogen: but this analysis is liable to some exceptions.

Medical properties and uses. — Nitric ether, although introduced into the Dublin Pharmacopœia, has not yet been generally used in practice; but it is probable that its properties are the same as those of sulphuric ether, and consequently it is applicable to the same cases.

VINA.

WINES.

WINE acts upon vegetable substances in nearly the same manner as diluted spirit, dissolving such of their proximate principles as can be taken up by water and alcohol when combined: hence it has been long used as a menstruum for extracting the active parts of medicinal vegetables; and the solutions thus formed have been denominated *Medicated Wines*. As a solvent, however, it is liable to the objection of inequality of strength; and owing to the spontaneous decomposition which it undergoes from exposure to the air, it is still more objectionable, this change being likely to take place sooner when it is imbued with principles all of which tend to hasten the fermentative process. To remedy these disadvantages in this class of preparations, Parmentier has proposed¹, that instead of preparing medicated wines in the usual method, the alcoholic tinctures well prepared should be added to wine in given quantities; by which means, he contends, the preparations are less nauseous, and, what is a still greater advantage, are always of a determinate strength. The British Colleges, however, still order medicated wines to be prepared after the old method. They should be kept in very well corked bottles, and in a cool situation. By the general term Wine, the London College means to designate Sherry Wine.

VINUM ALOES. Lond. *Wine of Aloes.*²

“Take of extract of spiked aloës, eight ounces; canella bark,

¹ *Annales de Chimie*, lii, 46.

² Vin d'Aloë (F.) Vino Aloetico (I.)

two ounces; wine, six pints; proof spirit, two pints. Rub the aloës to powder with white sand previously freed from any impurities; rub the canella bark also into powder, and on these, mixed together, pour the wine and spirits. Macerate for fourteen days, frequently shaking the vessel containing the mixture, and afterwards strain."

Dublin.

"Take of Socotorine aloës, four ounces; canella alba, an ounce; Spanish white wine, three pints; proof spirit, a pound. Let the aloës and the canella alba, separately reduced to powder, be mixed together, and pour on them the wine mixed with the spirit; then digest for fourteen days with frequent agitation; and lastly, strain the solution."

VINUM ALÖES SOCOTORINÆ. Edin. *Wine of Socotorine Aloës.*

"Take of Socotorine aloës in powder, one ounce; lesser cardamom seeds bruised, ginger root bruised, of each a drachm; Spanish white wine, two pounds. Digest for seven days, shaking the mixture frequently, and strain."

Wine is an excellent solvent of aloës, and therefore this solution contains all the virtues of the remedy in a more agreeable form than that of tincture. The sand ordered by the London College is intended to facilitate the pulverization of the aloës; but although it does not in the least affect the solution, yet it is seldom used; for by cutting the aloës into small pieces, and exposing them to the air, they become sufficiently pulverulent.

Medical properties and uses.—Wine of aloës is an excellent warm purgative and stomachic. It has long been employed with benefit in cold phlegmatic habits, paralysis, gout, dyspepsia, and chlorosis. The dose is from fʒj. to fʒij. to act as a stomachic, and from fʒj. to fʒij. to produce purging.

VINUM GENTIANÆ COMPOSITUM. Edin. *Compound Wine of Gentian.*¹

"Take of gentian root, half an ounce; cinchona bark, one ounce; orange peel dried, two drachms; canella alba, one drachm; proof spirit, four ounces; Spanish white wine, two pounds and a half. First pour the proof spirit on the root and the barks sliced and bruised; and after twenty-four hours add the wine; then macerate for seven days, and strain."

This wine when newly prepared is stomachic and tonic, but by keeping it is very apt to become acescent. The dose is from fʒiv. to fʒvj. given two or three times a day.

VINUM IPECACUANHÆ. Lond. *Wine of Ipecacuanha.*²

¹ Vin de Gentiane composé (F.) Vino di Genziana composto (I.)

² Vin d'Ipecacuanha (F.) Vino con Ipecacuana (I.)

"Take of ipecacuanha root bruised, *two ounces*; wine *two pints*. Macerate for fourteen days, and filter."

Edinburgh.

"Take of the root of ipecacuanha bruised, *one part*; Spanish white wine, *fifteen parts*. Macerate for seven days, and filter through paper."

Dublin.

"Take of the root of ipecacuanha bruised, *two ounces*; Spanish white wine, *two pints*. Digest for seven days, then filter."

From my trials I find that a pint of sherry wine takes up 100 grains of ipecacuanha, which is the larger proportion of the soluble matter contained in an ounce of the root; and as the active part of the root, or emetin, is more soluble in acetic acid than any other menstruum, the acescency of the wine is no objection. As an emetic it is equally efficacious, and at the same time milder in its operation than antimonial wine, and is therefore better adapted for infants. For this purpose a teaspoonful, or $\frac{1}{3}$ ss. is given for a dose, and repeated every ten minutes till it operates. In smaller doses it answers the same purposes as the powder, and is given in coughs, diarrhœa, dysentery, and other complaints in which a determination to the skin is indicated.

VINUM NICOTIANÆ TABACI. Edin. *Wine of Tobacco.*

"Take of tobacco leaves, *one part*; Spanish white wine, *twelve parts*. Macerate for seven days, and filter through paper."

This is the only form in which tobacco can be conveniently exhibited as an internal remedy. It is given to produce diuretic and antispasmodic effects in dropsies, colica pictonum, and ileus. The dose is from $\mathfrak{m}$ x. to $\mathfrak{m}$ xxx. in any proper vehicle.

VINUM OPII. Lond. Edin. *Wine of opium.**

"Take of extract of opium, *an ounce*; cinnamon bark, bruised, cloves bruised, of each *a drachm*; wine *a pint*. Macerate for eight days, (seven days, *Edin.*) and filter."

Wine extracts the active matter of opium, and forms a solution which agrees in its properties with the alcoholic tincture; but the aromatics this preparation contains are supposed to modify the action of the opium, and prevent the disturbance of the brain and nervous system, which the simple tincture is apt to induce in nervous habits, and where the head is much affected. Mr. Ware introduced the use of this tincture as a local application in the second stage of ophthalmia; when the

* Laudanum liquidum Sydenhemi, P. L. 1720. Vin d'Opium aromatique (F.) Vina aromo opiato (I.)

inflammatory symptoms have subsided, and the vessels of the conjunctiva remain turgid with red blood. Two or three drops are dropped into the eye every morning, until the redness is removed.

VINUM RHEL. Edin. *Wine of Rhubarb.*

“Take of rhubarb root, sliced, *two ounces*; canella bark, bruised, *a drachm*; proof spirit, *two ounces*; Spanish white wine, *fifteen ounces*. Macerate for seven days, and filter through paper.”

This wine, when newly prepared, has the same properties, and may be applied to the same uses as the tincture, but it is liable to undergo decomposition. The dose is from $\text{f}\frac{3}{4}\text{ss}$. to $\text{f}\frac{3}{4}\text{j}$. or more.

VINUM VERATRI, Lond. *Wine of white Hellebore.*

“Take of white hellebore root, bruised, *eight ounces*; wine, *two pints and a half*. Macerate for fourteen days, and filter.”

This preparation was supposed to form one of the ingredients of the Eau Medicinale; but this opinion is unfounded. It is seldom employed.

ACETICA.

PREPARATIONS OF VINEGAR.

VINEGAR is capable of dissolving all those proximate principles of plants which are soluble in water; and it is further found to extract more completely than any other solvent, the acrid matter on which the efficacy of squill and colchicum depends. As a solvent, however, of vegetable matter, the use of vinegar cannot be extended, as it destroys the medicinal properties of some vegetable principles, and does not accord with others in virtue. Medicated vinegars are very apt to spoil, notwithstanding the addition of spirit which is ordered; and therefore they should be made in small quantities only at a time, and preserved in well stopped glass bottles.

ACIDUM ACETICUM AROMATICUM. Edin. *Aromatic Vinegar.**

“Take of rosemary tops, dried, sage leaves, dried, of each *one ounce*; lavender flowers dried, *half an ounce*; cloves, bruised, *half a drachm*; distilled vinegar, *two pounds*. Macerate for seven days, and filter the expressed liquor through paper.”

* Vinsigre antiseptique (F.) Gewürzessig (G.) Aceto antisettico (I.)

This preparation has a pleasant pungent aromatic odour. It is a solution of the volatile oils of the substances employed in vinegar, and is a grateful perfume in sick-rooms; but has no right to be regarded as a prophylactic from fever, or other contagions. It is nearly the same as the old preparation, known under the name of *Thieves's Vinegar*.

ACIDUM ACETICUM CAMPHORATUM. Edin.
ACIDUM ACETICUM CAMPHORATUM. Dub. *Comphorated Acetic Acid.*²

“Take of acetic acid, (acetic acid, *Dub.*) *six ounces*; camphor, *half an ounce*. Rub the camphor to powder with the assistance of a little alcohol; then dissolve it in the acid.”

The strong acetic acid readily dissolves a considerable portion of camphor; and forms a very highly pungent and stimulating perfume, which, snuffed up the nostrils, is useful in syncope and nervous languors. Owing to its extreme volatility when well prepared, it requires to be preserved in phials closely fitted with ground-glass stoppers.

ACETUM COLCHICI. Lond. *Vinegar of Meadow Saffron.*

“Take of fresh meadow saffron root (bulb) sliced, *an ounce*; acetic acid, (distilled vinegar) *a pint*; proof spirit, *a fluid ounce*. Macerate the meadow saffron root with the vinegar in a covered glass vessel for twenty-four hours; then express, and set the liquor aside that the fæculencies may subside; lastly, add the spirit to the clear liquor.”

The bulb of the meadow saffron is the part intended to be ordered, not the root. When dug up in autumn it contains an acrid principle resembling that of the squill, of which vinegar is the proper solvent; and this solution is now introduced as a better form of preserving the virtues of the remedy than the oxymel. It is given as a diuretic in ascites and hydrothorax; but is less to be depended on than the squill. Like the preparation with wine, which is not yet admitted into the Pharmacopœia, it may be given in gout. The dose is from fʒss. to fʒj. united with honey, or in any bland fluid.

ACETUM SCILLÆ.² Lond. *Vinegar of Squill.*

“Take of fresh squill root (bulb) dried, *a pound*; acetic acid, (distilled vinegar) *six pints*; proof spirit, *half a pint*. Macerate the squill root (bulb) in the vinegar with a gentle heat, in a covered vessel, for twenty-four hours; then express the liquor and set it aside that the fæculencies may subside; lastly, add the spirit to the clear liquor.”

¹ Acide acetique Camphré (*F.*) Aceto Canforato (*I.*)

² Acetum scilliticum, *P. L.* 1720. 1745. Vinaigre scillitique (*F.*) Meerzwiebes-sig (*G.*)

ACIDUM ACETICUM SCILLITICUM. Edin. *Vinegar of Squill.*

"Take of squill root (bulb) dried, *one ounce*; distilled vinegar, *fifteen ounces*; alcohol, *one ounce and a half*. Macerate the squill with the acid for seven days; then express the liquor, and add to it the alcohol; and when the fæculencies have subsided, pour off the clear fluid."

ACETUM SCILLÆ. Dub. *Vinegar of Squill.*

"Take of fresh squill root (bulb) dried, *half a pound*; wine vinegar, *three pints*; rectified spirit, *four fluid ounces*. Digest the squill with the vinegar for four days in a glass vessel, with frequent agitation; then express the vinegar, and, after the fæculencies have subsided, add to it the spirit."

Vinegar extracts the acrid matter of the squill, upon which its efficacy as a remedy depends. It has long been used as an expectorant and diuretic in chronic catarrh, humoral asthma, and dropsies. The dose is from $\text{f}\text{ʒ}\text{ss}$. to $\text{f}\text{ʒ}\text{ij}$. given in cinnamon or mint water. In larger doses it produces vomiting; and is occasionally used as an emetic in the above diseases, when the stomach is loaded.

When kept, the vinegar of squill deposits a precipitate, which consists of citrate of lime and tannin.¹

Officinal preparations. *Oxymel Scillæ*. L. *Syrupus Scillæ*. E.

MELLITA.

PREPARATIONS OF HONEY.

A MORE correct knowledge of the operation of those medicinal substances which have been named *balsamic* or *pectoral*, has set aside the high opinion which formerly prevailed of the efficacy of honey as a remedy in pulmonary diseases. It is, however, still employed in pharmacy, and has some advantages over syrup, particularly where it is to be employed as a local application; but for internal purposes its use is to a certain degree limited, owing to the unpleasant effects which it produces on the bowels of some individuals. The Edinburgh College has altogether rejected this class of preparations, but a few of them are retained by the London and Dublin Colleges. They are not apt to spoil, and therefore require less care to preserve them than the syrups.

MEL DESPUMATUM. Lond. Dub.² *Clarified Honey.*

¹ Vogel. *Annales de Chimie*, vol. lxxxiii. p. 157.

² Miel despumé (F.) Geschäumter Honig (G.) Mele Schiumato (I.)

"Melt the honey in a water-bath: then remove the scum."

By thus liquefying honey, the wax it may have retained when expressed from the comb rises to the surface; and at the same time any sand or other impurities with which it may have been fraudulently mixed, fall to the bottom or rise with the wax, and are easily separated. The specific gravity of purified honey is 1.31; it is chiefly employed for forming the other preparations into which honey enters.

MEL BORACIS. Lond. *Honey of Borax.*

"Take of sub-borate of soda, powdered, *a drachm*; clarified honey, *an ounce*. Mix them."

This is a cooling, detergent, useful application to the tongue and fauces in aphthous affections. Dissolved in water it forms an excellent gargle for allaying the pain attending mercurial salivations.

MEL ROSÆ. Lond. *Rose Honey.*¹

"Take of the petals of the red rose, dried, *four ounces*; boiling water, *three pints*; clarified honey, *five pounds*. Macerate the petals in the water for six hours; then to the filtered liquor add the honey, and boil it down to a proper consistence by means of a water-bath."

Dublin.

"Take of the petals of red rose buds, dried and freed from their claws, *four ounces*; boiling water, *three pints*; honey, *five pounds*. Macerate the petals in the water for six hours; then mix the honey with the strained liquor, and boil the mixture to the consistence of a syrup, taking off the scum."

This honey has the pleasant flavour of the rose, and a slight degree of astringency. In making it, the clarified honey ordered by the London College is to be preferred. It is chiefly employed as an adjunct to detergent and astringent gargles.

OXYMEL SIMPLEX.² Lond. Dub. *Oxymel.*

"Take of clarified honey, *two pounds*; acetic acid (distilled vinegar), *one pound*. Boil them in a glass vessel, by a gentle heat, to a proper consistence."

Simple oxymel in doses of ℥j. or more, dissolved in barley-water, forms a pleasant and cooling beverage in fevers and inflammatory affections. It is often added to gargles in cynanche tonsillaris, and is a common vehicle of other remedies in catarrhal complaints. The Dublin College orders it to be prepared with unclarified honey, skimming it during the boiling; but the London directions are to be preferred.

¹ Mel Rosarum, P. L. 1720. Mel rosaceum, P. L. 1745. Miel rosat (F.) Rosenhonig (G.) Mele rosato (I.)

² Mel acetatum, P. L. 1787. Oxymel (F.) Essighonig (G.) Ossimele (I.)

OXYMEL COLCHICI. Dub. *Oxymel of Meadow Saffron.*

“Take of the fresh root (bulb) of meadow saffron cut into thin slices, *one ounce*; distilled vinegar, *a pint*; clarified honey, *two pints*. Digest the colchicum with the vinegar, in a glass vessel, for two days; then to the liquor strongly expressed from the root, add the honey; and lastly, boil down the mixture to the consistence of a syrup, frequently stirring it during the boiling with a wooden spoon.”

The active matter of the colchicum is apt to be injured by the boiling; and hence this preparation is very uncertain in point of strength. It is given in humoral asthma, and in dropsies. The dose is fʒj, gradually increased to fʒj, given in a cupful of gruel, twice a day.

OXYMEL SCILLÆ.¹ Lond. Dub. *Oxymel of Squill.*

“Take of clarified honey, *three pounds*; vinegar of squill, *two pints*. Boil in a glass vessel, over a gentle fire, to a proper consistence.”

Oxymel of squill is principally employed as an expectorant, and as such is very useful in humoral asthma, and chronic coughs, in doses of from fʒss to fʒij. It is generally given in some aromatic distilled water, to prevent the nausea which it is apt to induce; in larger doses it is given to excite vomiting, and at the same time clear the chest, in whooping-cough.

When kept for a considerable time, this oxymel lets fall a precipitate which has the aspect of crystallized honey. Vogel found it to consist of citrate of lime, tannin, and honey.²

SYRUP.

SYRUPS.

THESE are saturated solutions of sugar in water, either simple, or united with some vegetable principle, with the view either to colour, flavour, or medicinal virtue: but for the last intention, this is perhaps the worst of all forms for obtaining the medical qualities of substances: and, therefore, as syrups seldom possess much activity, they are chiefly employed to render more active remedies palatable. Upon the whole, however, they are not well adapted even for this purpose, few persons thinking that sweetness renders a nauseous drug more

¹ Oxymel scilliticum, P. L. 1720. 1745. Meerzwiebelhonig (G.)

² *Annales de Chimie*, vol. lxxxiii. p. 157.

palatable; and, with a few exceptions, they might be properly rejected from the pharmacopœias.

In making syrups, refined sugar should always be employed; or, if coarser sugar be used, the syrup should be clarified, by beating to a froth the white of eggs with a small portion of water, and adding it to the solution of sugar and water before boiling. The albumen coagulates as the syrup boils, and, involving the impurities which the sugar contained, rises to the surface in the form of a scum, which must be carefully removed. If too much sugar be used, or if the syrup be too long boiled, the sugar soon crystallizes; and if it be in too small proportion, the syrup quickly ferments, and becomes aced. The most certain test of the proper consistence of a syrup is its specific gravity, which, when cold, should be 1.385. But, however well prepared, syrups are apt to ferment when kept in a temperature above 60°; and, therefore, the following direction relative to their preservation is given by the London College.

“Let syrups be preserved in a place the temperature of which never exceeds 55°.”

SYRUPUS SIMPLEX. Lond. *Syrup.*¹

“Take of refined sugar, *two pounds and a half*; water, *a pint*. Dissolve the sugar in the water by means of a water-bath; then set it aside for twenty-four hours; take off the scum, and, if there be any fæces, pour off the clear part from them.”

SYRUPUS SIMPLEX. Edin. *Simple Syrup.*

“Take of purified sugar, *fifteen parts*; water, *eight parts*. Dissolve the sugar in the water by a gentle heat, and boil it a little so as to form a syrup.”

SYRUP. Dub. *Syrups.*

“In making syrups, for which neither the weight of the sugar nor the mode of dissolving it is specified, the following rule is to be observed:

“Take of refined sugar reduced to a fine powder, *twenty-nine ounces*; the liquor prescribed, *one pint*. Add the sugar by degrees, and digest with a moderate heat, in a close vessel, until it is dissolved, frequently stirring it; set the solution aside for twenty-four hours, take off the scum, and pour off the syrup from the fæces, if there be any.”

Simple syrup, when properly prepared, should be inodorous, sweet, thickish, nearly colourless, and perfectly transparent.

SYRUPUS ACETI. Edin. *Syrup of Vinegar.*²

¹ Sirop (F.) Einfacher syrup (G.) Sciroppo (I.)

² Syrop d'acide acétique (F.) Sciroppo acetico (I.)

"Take of vinegar, *five parts*; refined sugar, *seven parts*. Boil, so as to form a syrup."

This syrup is very liable to undergo decomposition: it should, therefore, be made in small quantities only at a time. It may be used for sweetening barley-water or gruels, in fevers and inflammatory diseases.

SYRUPUS ALLII. Dub. *Syrup of Garlic.*

"Take of garlic root (bulb) sliced, *a pound*; boiling water, *two pints*. Macerate the garlic in the water, in a covered vessel, for twelve hours; then let the sugar be added to the strained liquor, and a syrup formed."

This is a very disagreeable syrup; but contains the virtues of the garlic in a sufficient degree to entitle it to some attention.

SYRUPUS ALTHÆÆ. Lond. *Syrup of Marsh Mal-*
*lows.*¹

"Take of fresh marsh mallow root bruised, *half a pound*; refined sugar, *two pounds*; water, *four pints*. Boil down the water with the marsh mallow root to one half, and express the liquor when it is cold. Set it aside for twenty-four hours, that the fæces may subside; then decant off the clear liquor, and, having added to it the sugar, boil down to a proper consistence."

SYRUPUS ALTHÆÆ OFFICINALIS. Edin. *Syrup of Marsh*
Mallows.

"Take of fresh root of marsh mallows sliced, *one part*; water, *ten parts*; refined sugar, *four parts*. Boil the water with the root down to one half, and, expressing it strongly, strain. Put aside the strained liquor, and, when the fæces have subsided, add to it the sugar; then boil so as to form a syrup."

This is a solution of vegetable mucus and syrup, and is thence supposed to possess demulcent properties; but these are very trivial; and owing to the small proportion of sugar it contains, it very soon suffers spontaneous decomposition.

SYRUPUS AURANTIORUM. Lond. *Syrup of Oranges.*²

"Take of fresh orange-peel, *two ounces*; boiling water, *a pint*; refined sugar, *three pounds*. Macerate the bark in the water for twelve hours in a covered vessel; then pour off the liquor, and add to it the sugar."

SYRUPUS CITRI AURANTII. Edin. *Syrup of Orange.*

"Take of fresh peel of Seville oranges, *three ounces*; boiling

¹ Sirop d'Althea (F.) Althee syrup (G.) Sciroppo d'Altea (I.)

² Sirop d'écorce d'orange (F.) Pomeranzenschaleusyrup (G.) Sciroppo di Corteccia di Arancio (I.)

water, *one pound and a half*; refined sugar, *three pounds*. Macerate the bark in the water in a covered vessel for twelve hours; then add the sugar to the strained liquor, and expose it to a gentle heat so as to form a syrup."

SYRUPUS AURANTII. Dub. *Syrup of Orange.*

"Take of the fresh peel of Seville oranges, *eight ounces*; boiling water, *six pints*. Macerate for twelve hours in a covered vessel, and dissolve as much sugar in the filtered liquor as will form a syrup."

The quantity of water ordered by the Edinburgh College is too great; particularly as the application of a degree of heat sufficient to evaporate part of it would dissipate also the flavour of the orange-peel, for which the syrup is chiefly valued. A syrup equally agreeable and efficacious may be made by adding f̄j. of tincture of orange-peel to a pint of simple syrup.

SYRUPUS COLCHICI AUTUMNALIS. Edin. *Syrup of Meadow Saffron.*

"Take of fresh meadow saffron root (bulb) cut into thin slices, *one ounce*; distilled vinegar, *sixteen ounces*; refined sugar, *twenty-six ounces*. Macerate the root in the acid for two days, shaking the vessel occasionally; then expressing gently, strain the liquor, and to it add the sugar; lastly, boil a little so as to form a syrup."

With the substitution of syrup for honey, this preparation is similar to the oxymel. The dose is f̄ij, increased gradually to f̄j or more.

SYRUPUS CROCI. Lond. *Syrup of Saffron.*

"Take of saffron, *an ounce*; boiling water, *a pint*; refined sugar, *two pounds and a half*. Macerate the saffron in the water for twelve hours, in a slightly covered vessel; then filter the liquor, and add to it the sugar."

This syrup is cordial in a small degree; but it is chiefly valued on account of its beautiful colour.

SYRUPUS DIANTHI CARYOPHYLLI. Edin. *Syrup of the Clove July Flower.*

"Take of recent petals of the clove July flower, freed from their claws, *one part*; boiling water, *four parts*; refined sugar, *seven parts*. Macerate the petals in the water for twelve hours; then add the sugar to the strained liquor, and dissolve it with a gentle heat."

SYRUPUS CARYOPHYLLI RUBRI. Dub. *Syrup of Clove July Flower.*

"Take of fresh petals of the clove July flower, freed from

1 Sirop de Safran (F.) Safransyrup (G.)

the claws, *two pounds*; boiling water, *six pints*. Macerate for twelve hours in a glass vessel; and dissolve a sufficient quantity of sugar in the strained liquor to make a syrup."

This syrup is valued for the rich colour, and the agreeable flavour of the flowers, which it possesses in perfection when well prepared. Alkalies change the colour to green, and form a test of the genuineness of the syrup; for they do not produce this effect on a counterfeit syrup, made of an infusion of cloves and coloured with cochineal, which is sometimes sold for it; but the one is as good as the other.

SYRUPUS LIMONUM. Lond. *Syrup of Lemon.*¹

"Take of strained lemon-juice, *a pint*; refined sugar, *two pounds*. Dissolve the sugar in the lemon-juice, in the manner directed for syrup."

SYRUPUS CITRI MEDICÆ. Edin. *Syrup of Lemons.*

"Take of lemon-juice, strained after the fæces have subsided, *three parts*; refined sugar, *five parts*. Dissolve the sugar."

SYRUPUS LIMONIS. Dub. *Syrup of Lemon.*

"Take of expressed lemon-juice, *two pints*. As soon as the fæces have subsided put it into a mattrass, and immerse it in boiling water for a quarter of an hour; when cold, strain it through a sieve, and make it into a syrup."

This is an agreeable syrup for acidulating barley water or other drinks in febrile diseases. It is also an useful adjunct to gargles in inflammatory sore-throat.

SYRUPUS MORI. Lond. *Syrup of Mulberry.*²

"Take of strained mulberry juice, *a pint*; refined sugar, *two pounds*. Dissolve the sugar in the mulberry juice in the manner ordered for syrup."

This syrup is used for the same purposes as the syrup of lemons, and has besides the advantage of colour.

SYRUPUS OPII. Dub. *Syrup of Opium.*³

"Take of the watery extract of opium, *eighteen grains*; boiling water, *eight ounces*. Macerate until the opium be dissolved; then add sugar so as to make a syrup."

The watery extract of opium contains the virtues of the opium, without its stimulant qualities. Each ounce of this syrup contains gr. j. of the watery extract. It is a useful anodyne for allaying the irritation which keeps up the cough in catarrh after the inflammatory symptoms are abated, and for procuring sleep, in the diseases of children.

SYRUPUS PAPAVERIS. Lond. *Syrup of Poppy.*⁴

¹ Zitronensaftsymp (G.)

² Maulbeersymp (G.)

³ Sirop d'opium (F.) Opiumsyrup (G.) Sciroppo di oppio (I.)

⁴ Sirop de Pavot blanc (F.) Sciroppo di Papaveri bianchi (I.)

"Take of the dried capsules of the poppy bruised and freed from the seeds, *fourteen ounces*; refined sugar, *two pounds*; boiling water, *two gallons and a half*. Macerate the capsules in the water for twelve hours; then boil it down in a water-bath to one gallon, and express strongly. Boil the liquor again down to two pounds, and strain it while it is hot. Set it aside twelve hours that the fæces may subside; then boil down the clear liquor to one pint, and add the sugar, in the manner ordered for making syrup."

SYRUPUS PAPAVERIS SOMNIFERI. Edin. *Syrup of White Poppy.*

"Take of the capsules of the white poppy dried, and freed from the seeds, *one part*; boiling water, *fifteen parts*; refined sugar, *two parts*. Macerate the sliced capsules in the water for twelve hours; then boil until a third part only of the liquor remains; and expressing strongly, strain the decoction. Boil the strained liquor to one half, and again strain it; lastly, having added the sugar, boil it for a short time, so as to form a syrup."

SYRUPUS PAPAVERIS ALBI. Dub. *Syrup of White Poppies.*

"Take of the capsules of the white poppy, gathered before they are ripe, dried, and freed from the seeds, *a pound*; boiling water, *three pints*. Slice and bruise the capsules; then pour over them the water, and macerate for twelve hours; express the liquor, and evaporate it by a gentle heat to a pint; strain through a thin linen cloth, and set it aside six hours that the fæces may subside; finally, add sugar to the clear liquor that it may make a syrup."

The narcotic principle of the poppy is taken up by the water, but it is very probable that any variation of the degree of heat necessary to produce the evaporation, will alter in a considerable degree the nature of the extract, and must consequently make the syrup differ in point of strength. It ferments more readily than most other syrups, but loses its narcotic property when it becomes acescent. One fluid ounce of it contains about one grain of extract.

Medical properties and uses.—Syrup of poppy is an useful anodyne for allaying the violence of the cough in catarrh, for easing pain, and procuring sleep in children's diseases. The dose is from fʒj. to fʒj. according to the age of the patient.

SYRUPUS RHEADOS. Lond. *Syrup of the Red Poppy.*¹

"Take of the recent petals of the red poppy, *a pound*; boiling water, *a pint and two fluid ounces*; refined sugar, *a pound and a half*. To the water, heated in a water bath, add gra-

¹ Sirop de Coquelicot (F.) Klatschrosen syrup (G.)

dually the petals of the red poppy, stirring them occasionally; then, having removed the vessel, macerate for twelve hours; press out the liquor, and set it aside that the impurities may subside; lastly, add the sugar in the manner directed for making syrup.

SYRUPUS PAPAVERIS ERRATICI. Dub. *Syrup of the Red Poppy.*

"Take of the fresh petals of the red poppy, *a pound*; boiling water, *twenty fluid ounces*. Add the flowers gradually to the boiling water; then, having removed the vessel from the fire, macerate in a lower heat for twelve hours; express the liquor, and set it aside that the fæces may subside; finally, let the sugar be added so as to make a syrup."

By attending strictly to the directions of either of the above formulæ, the petals yield their fine rich colour, for which alone the syrup is valued.

SYRUPUS RHAMNI. Lond. *Syrup of Buckthorn.*

"Take of the fresh juice of buckthorn berries, *four pints*; ginger root sliced, pimenta berries bruised, of each *half an ounce*; refined sugar, *three pounds and a half*. Set apart the juice for three days that the fæces may subside, and strain it. To the strained juice add the ginger root, and pimenta berries; then macerate by a gentle heat for four hours and strain. Boil the remainder of the juice down to a pint and a half; mix the liquors, and add the sugar in the manner directed for making syrup."

SYRUPUS RHAMNI CATHARTICI. Edin. *Syrup of Buckthorn.*

"Take of the clarified juice of ripe buckthorn berries, *two parts*; refined sugar, *one part*. Boil so as to form a syrup."

Of these two formulæ, that of the London College is to be preferred, as the addition of the ginger and all-spice tends to cover the unpleasant taste of the buckthorn juice, and prevent the violent griping which it is apt to induce. It is a brisk cathartic; but owing to the unpleasantness of its operation, and the dryness of the mouth and fauces it occasions, it is seldom used, except as a horse medicine. The dose is from fʒss. to fʒj. drinking freely of tepid demulcent fluids during its operation.

SYRUPUS RO'SÆ. Lond. *Syrup of Roses.*

"Take of the petals of the hundred-leaved rose dried, *seven ounces*; refined sugar, *six pounds*; boiling water, *four pints*. Macerate the rose petals in the water for twelve hours, and strain. Evaporate the strained liquor in a water-bath down

¹ Syr. de Spina cervina, P. L. 1720. Syrupus Spinæ cervinæ, P. L. 1787.

² Syr. e Rosis siccis, P. L. 1720. Syr. Rosarum solutivus, P. L. 1745.

to two pints and a half; then add the sugar so as to make a syrup."

SYRUPUS ROSÆ CENTIFOLIÆ. Edin. *Syrup of Damask Roses.*

"Take of the fresh petals of the damask rose, *one part*; boiling water, *four parts*; refined sugar, *three parts*. Macerate the petals in the water for twelve hours; then add the sugar to the strained liquor, and boil, so as to form a syrup."

This syrup has none of the agreeable odour of the rose, but possesses weak purgative properties; on which account it is given as a laxative in very weak habits, and to infants. The dose is from f3ij. to f3xij. or more.

SYRUPUS ROSÆ GALLICÆ. Edin. *Syrup of Red Roses.*¹

"Take of the petals of the red rose dried, *one part*; boiling water, *nine parts*; refined sugar, *ten parts*. Macerate the petals in the water for twelve hours; then boil a little, and strain. Add the sugar to the strained liquor, and again boil a little, so as to form a syrup."

This syrup is a very weak astringent; and as such is added to astringent and stomachic infusions and gargles; but it is chiefly valued on account of its flavour and colour.

SYRUPUS SCILLÆ MARITIMÆ. Edin. *Syrup of Squill.*²

"Take of vinegar of squill, *four parts*; refined sugar powdered, *seven parts*. Dissolve the sugar by a gentle heat, so as to make a syrup."

This syrup has the same properties, and is employed for the same purposes, as the oxymel of squill. The dose is from f3j. to f3ij. given in any aromatic distilled water.

SYRUPUS SENNÆ. Lond. *Syrup of Senna.*

"Take of senna leaves, *two ounces*; fennel seeds bruised, *an ounce*; manna, *three ounces*; refined sugar, *a pound*; boiling water, *a pint*. Macerate the senna leaves and the fennel seeds in the water in a gentle heat for twelve hours; strain the liquor, mix with it the manna and the sugar; and boil to a proper consistence."

SYRUPUS CASSIÆ SENNÆ. Edin. *Syrup of Senna.*

"Take of senna leaves *two ounces*; boiling water, *a pound and a half*; burnt syrup *eight ounces*. Macerate the leaves in the water in a covered vessel for four hours, and strain; then add the syrup, and boil with a gentle heat until the whole acquires the consistence of the burnt syrup.

Dublin.

"Take of manna, refined sugar, of each *a pound*; senna

¹ Sirop de Roses rouges (F.) Rosen syrup (G.) Sciroppo di Rose Rosse (I.)

² Sirop aceteux de Scille (F.) Sciroppo di Squilla marino acetoso (I.)

leaves, *half an ounce*; boiling water, *a pint*. Let the senna leaves be macerated in the water in a covered vessel for twelve hours; then dissolve the manna and the sugar in the strained liquor."

This syrup contains the purgative properties of the senna, and is chiefly intended for children; but the simple infusion of senna, sweetened with sugar, and with the addition of a little milk, given in the form of tea, is more willingly taken by children, and operates with more certainty.

SYRUPUS TOLUTANUS. Lond. *Syrup of Tolu.*¹

"Take of balsam of Tolu, *an ounce*; boiling water, *a pint*; refined sugar, *two pounds*. Boil the balsam in the water for half an hour in a close vessel, frequently stirring it, and strain the liquor when it is cold; then add the sugar so as to make a syrup."

SYRUPUS TOLUIFERA BALSAMI. Edin. *Syrup of Tolu.*

"Take of simple syrup, *two pounds*; tincture of balsam of Tolu, *one ounce*. To the syrup immediately after it is made, and before it is quite cold, add the tincture gradually, and with frequent stirring."

By following the London formula a more elegant and grateful syrup is obtained than that produced by the Edinburgh method, and which owes its qualities to the benzoic acid of the balsam; but the syrup ordered by the Edinburgh College is sufficient for all the uses to which it can be applied. It is whitish and turbid, owing to a partial decomposition of the tincture, which deposits its resin when mixed with the syrup. Its only use is to give a pleasant flavour to disagreeable draughts and mixtures.

SYRUPUS VIOLÆ ODORATÆ. Edin. *Syrup of Violet.*²

"Take of flowers of the odorous violet, *two parts*; boiling water, *eight parts*; refined sugar, *fifteen parts*. Macerate the flowers in the water for twenty-four hours, in a covered glass or glazed earthenware vessel; then strain without expression, and add the sugar."

SYRUPUS VIOLÆ. Dub. *Syrup of Violet.*

"Take of the fresh petals of the violet, *two pounds*; boiling water, *five pints*. Macerate for twenty-four hours; then strain the liquor through fine linen with expression; and add a sufficient quantity of sugar to make a syrup."

This syrup has a deep blue colour, and a very agreeable flavour. The colour, however, which constitutes its chief value, is apt to suffer by keeping; and, hence, the syrup is

¹ Syr. balsamicus, P. L. 1720. Syrop Balsamique (F.)

² Sirop de Violettes (F.) Violensyrups (G.) Sciroppo di Viole (I.)

often counterfeited with materials, the colour of which is more permanent, and which are more easily obtained. This fraud is easily detected by adding a little acid or alkali to a portion of the suspected syrup: if it be genuine, the acid will change the blue colour to red, and the alkali to green; but if it be counterfeited, these changes will not take place.

Medical properties and uses.—This syrup acts as a gentle laxative when given to infants; but it is chiefly used as a test of the presence of acids and alkalies.

SYRUPUS ZINGIBERIS. Lond. *Syrup of Ginger.*¹

"Take of ginger root sliced, *two ounces*; boiling water, *a pint*; refined sugar, *two pounds*. Macerate the ginger root in the water for four hours, and strain; then add the sugar so as to make a syrup."

Dublin.

"Take of ginger root bruised, *four ounces*; boiling water, *three pints*. Macerate for twenty-four hours; then strain the liquor, and add sugar so as to make a syrup."

SYRUPUS AMOMI ZINGIBERIS. Edin. *Syrup of Ginger.*

"Take of ginger root powdered, *six drachms*; boiling water, *one pound*; refined sugar, *twenty-two ounces*. Macerate the root in the water, in a covered vessel, for twenty-four hours; then add the sugar to the strained infusion, and dissolve by a gentle heat."

This syrup is moderately stimulant and carminative; and is an useful adjunct to bitter and tonic infusions.

Official preparations. *Electuarium Catechu*. D. *Electuarium opiatum*. E.

CONFECTIONES.

CONFECTIONS.

UNDER this title the London College comprehends the *Conserve*s and *Electuaries* of its former Pharmacopœia, and of the present Edinburgh and Dublin Pharmacopœias. There is, however, a distinction between confections or conserves and electuaries, which prevents them in strict propriety from being classed together; and which we shall point out, although at the same time we adhere to the title of the London College.

CONFECTIONS or CONSERVES consist of fresh vegetable matters beat into an uniform mass with refined sugar. They are designed to preserve as nearly as possible unaltered the

¹ Sirop de Gingembre (F.) Sciroppo d' Amomo Zenzero (I.)

virtues or properties of recent vegetables; and to prevent the decomposition to which they would otherwise be liable: and although several delicate flowers and fruits and juicy plants can be well preserved by this means, yet this form of preparation is not adapted for all plants; and in almost all cases the active ingredients are injured by keeping in this form. As remedies, confections scarcely ever possess great activity; and are chiefly useful as vehicles for the exhibition of more active substances. They should be kept in closely covered jars, in order to preserve their proper degree of moisture.

ELECTUARIES are mixtures of vegetable and light earthy powders, combined by means of honey or syrup so as to form masses of a moderate consistence. All substances of this description may, therefore, be made into electuaries; but as the intention of this form of preparation is to render remedies as palatable as possible, those matters only can be employed to form electuaries, the taste of which is not too ungrateful to be covered by syrup or honey. They are more active remedies than conserves; but still the more powerful vegetable substances cannot well be exhibited in this form, on account of their taste; and the metallic salts are too ponderous to remain suspended in either syrup or honey. In making electuaries, the degree of consistence must always be regulated by the nature of the substances which enter into them.

"In conserves," as Mr. Murray justly observes, "the addition of the saccharine matter is in much larger proportion, and is designed to preserve the vegetable matter; in electuaries, the syrup is designed merely to communicate the required form."

The following general rule is given by the London College for restoring the consistence of confections and electuaries, when they have become hard by keeping:

"If confections have become hard from long keeping, they are to be moistened with water, so as to restore their proper consistence."

CONFECTIO AMYGDALARUM. Lond. *Confection of Almonds.*

"Take of sweet almonds, *an ounce*; acacia gum in powder, *a drachm*; refined sugar, *half an ounce*. Macerate the almonds in water to free them from their cuticle, then beat all the ingredients together, until they be thoroughly incorporated."

This preparation is introduced as affording an easy and expeditious mode of preparing the almond mixture, the extemporaneous preparation of which is tedious. A little of this paste, triturated with a sufficient portion of water, immediately forms an emulsion.

CONFECTIO AROMATICA. Lond. *Aromatic Confection.*¹

"Take of cinnamon bark, nutmegs, of each *two ounces*; cloves, *an ounce*; cardamom seeds, *half an ounce*; saffron dried, *two ounces*; prepared shells, *sixteen ounces*; refined sugar powdered, *two pounds*; water, *a pint*. Rub the dry substances mixed together into a very fine powder; then add the water gradually, and mix until the whole be thoroughly incorporated."

ELECTUARIUM AROMATICUM. Edin. *Aromatic Electuary.*

"Take of the aromatic powder, *one part*; syrup of orange, *two parts*. Mix and beat them well together so as to form an electuary."

Dublin.

"Take of cinnamon bark, nutmegs, of each *half an ounce*; refined sugar, saffron, of each *an ounce*; lesser cardamom seeds husked, cloves, of each *two drachms*; precipitated chalk, *two ounces*; syrup of orange, *a sufficient quantity*. Reduce the aromatics separately to powder, and then mix them with the syrup."

These combinations of aromatics are stimulant, and cordial. They are given with advantage in typhoid fevers, atonic gout, and nervous languors; either alone in the form of bolus, or combined with camphor and syrup of orange-peel, in the form of mixture. The dose is from gr. x. to ʒj. or more.

CONFECTIO AURANTIORUM. Lond. *Confection of Oranges.*

"Take of the external rind of the fresh orange, separated by rasping, *a pound*; refined sugar, *three pounds*. Beat the rind in a stone mortar with a wooden pestle; then add the sugar, and continue the beating until they be thoroughly incorporated."

CONSERVA AURANTII. Dub. *Conserve of Orange.*

"To the rind of Seville orange, rasped off, add three times its weight of refined sugar, while beating it."

CONSERVA CITRI AURANTII. Edin. *Conserve of Orange.*

"Grate off the exterior rind of Seville oranges, beat it into a pulp, and during the beating add gradually three times its weight of refined sugar."

This confection is gently stomachic, and is a pleasant vehicle for the exhibition of tonic powders.

CONFECTIO CASSIÆ. Lond. *Confection of Cassia.*

"Take of fresh cassia pulp, *half a pound*; manna, *two ounces*; tamarind pulp, *an ounce*; syrup of roses, *half a pound*.

¹ Electuare Aromatique (F.) Gewürzlatwerge (G.) Elettuario Aromatico (I.)

Bruise the manna; then dissolve it in the syrup, by the heat of a water bath, and, having mixed in the pulp, evaporate down to a proper consistence."

ELECTUARIUM CASSIÆ FISTULÆ. Edin. *Electuary of Cassia.*

"Take of cassia pulp, *four parts*; tamarind pulp, manna, of each *one part*; syrup of damask roses, *four parts*. Bruise the manna in a mortar, and dissolve it in the syrup, by means of a gentle heat; then add the pulps, and by a continued heat reduce the mixture to a proper consistence."

ELECTUARIUM CASSIÆ. Dub. *Electuary of Cassia.*

"Take of fresh extracted cassia pulp, *half a pound*; manna, *two ounces*; tamarind pulp, *an ounce*; syrup of orange, *half a pound*. Bruise the manna, then dissolve it in the syrup by means of a moderate heat, and add the pulp; lastly, evaporate slowly the mixture to a proper consistence."

This electuary is gently laxative, and is used to relieve habitual costiveness; as a purge for children; and as a vehicle for the exhibition of other more powerful purgatives. Although it appears, *a priori*, to be of a nature apt to ferment and become acescent, yet it may be kept for six months without undergoing any very particular change.

CONFECTIO OPII. Lond. *Confection of Opium.*¹

"Take of hard opium powdered, *six drachms*; long pepper, *an ounce*; ginger root, *two ounces*; caraway seeds, *three ounces*; syrup, *a pint*. Rub the opium with the syrup made hot, then add the remaining articles reduced to powder, and mix."

ELECTUARIUM OPIATUM; olim, ELECTUARIUM THEBAICUM. Edin. *Opiate Electuary*; formerly, *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, *a pound*. Mix, so as to make an electuary."

The operation of the opium, which is the most important ingredient in these preparations, is modified by the aromatics. They are intended as substitutes for the *mithridate* and *theriaca* of the old pharmacopœias, which were too long allowed to disgrace modern pharmacy. They are stimulant narcotics; and are usefully employed in atonic gout, flatulent colic, and in diarrhoeas, unattended by any inflammatory symptoms. Thirty-six grains of the London confection contain one grain of opium, and the same quantity is contained in forty-three of the Edinburgh electuary. The dose is from grs. x. to fʒj. given in the form of bolus, or diffused in the chalk mixture.

¹ Electuaire Opiate (F.) Theriaklatwerge (G.) Elettuario Oppiato (I.)

ELECTUARIUM CATECHU COMPOSITUM. Edin.

Compound Electuary of Catechu.

"Take of extract of catechu, *four ounces*; kino, *three ounces*; cinnamon bark, nutmegs, of each *one ounce*; opium, diffused in a sufficient quantity of Spanish white wine, *a drachm and a half*; syrup of red roses boiled to the thickness of honey, *two pounds and a quarter*. Reduce the solid ingredients to powder; then mix them with the opium and syrup, so as to form an electuary."

Dublin.

"Take of catechu, *four ounces*; cinnamon bark, *two ounces*; kino, *three ounces*; rub them to powder, and add, of hard refined opium diffused in Spanish white wine, *a drachm and a half*; syrup of ginger boiled to the consistence of honey, *two pounds and a quarter*. Mix them."

These are useful combinations of astringents and aromatics; and may be efficaciously given in diarrhoeas, and the last stage of dysentery, either in the form of bolus, or diffused in some distilled water. The dose is from $\mathfrak{z}j.$ to $\mathfrak{z}ij.$ Ten scruples contain one grain of opium.

CONFECTIO ROSÆ CANINÆ. Lond. *Confection of the Dog Rose.*¹

"Take of pulp of the dog-rose, *a pound*; refined sugar, in powder, *twenty ounces*. Rub them together until they be well incorporated."

Edinburgh.

"Take of the fresh fruit of the dog-rose, carefully freed from the seeds and inclosed spiculæ, beat it to a pulp, and while beating add gradually three times its weight of double refined sugar."

CONFECTIO ROSÆ GALICÆ. Lond. *Confection of the Red Rose.*²

"Take of the unblown petals of the red rose, freed from the claws, *a pound*; refined sugar, *three pounds*. Beat the petals in a stone mortar; then add the sugar, and beat again until the whole be thoroughly incorporated."

Edinburgh.

"Beat the unblown petals of the red rose to a pulp; and add during the beating three times their weight of refined sugar."

CONSERVA ROSÆ. Dub. *Conserve of Roses.*

"Beat the unblown petals of the red rose, freed from their claws; adding gradually three times their weight of refined sugar."

The confection of the red rose possesses a small degree of astringency, and is sometimes given dissolved in new milk, as

¹ Conserva Fructus Cynosbati, P. L. 1745. Conserva Cynosbati, P. L. 1787.

² Conserva Rosarum rubrarum, P. L. 1720. Conserva Rosæ, P. L. 1787. Conserve de Roses rouges (F.) Rosenconserve (G.) Conserva di Rose rosse (I.)

a tonic in early convalescence from acute diseases; but the chief use of the confections of both kinds of roses, is to form pleasant vehicles for more active remedies.

CONFECTIO RUTÆ. Lond. *Confection of Rue.*¹

"Take of rue leaves dried, carraway seeds, laurel berries, of each *an ounce and a half*; segapenum, *half an ounce*; black pepper, *two drachms*; clarified honey, *sixteen ounces*. Rub the dry articles together to a very fine powder; then add the honey, and mix the whole together."

This electuary, we are informed, is introduced as a substitute for the old *Bay Berry Electuary*. It possesses some antispasmodic powers; but is used in the form of enema only; from ʒj. to ʒj. dissolved in ʒss. of gruel, being administered in the convulsive affections of infants, and flatulent colic.

CONFECTIO SCAMMONEÆ.² Lond. *Confection of Scammony.*

"Take of scammony powdered, *an ounce and a half*; cloves bruised, ginger root powdered, of each *six drachms*; oil of carraway, *half a drachm*; syrup of roses, *a sufficient quantity*. Rub the dry substance into a very fine powder; then add gradually the syrup, and rub them again; lastly, after adding the oil of carraway, mix the whole together."

ELECTUARIUM SCAMMONII. Dub. *Electuary of Scammony.*

"Take of scammony, ginger root, of each reduced to powder, *an ounce*; oil of cloves, *a scruple*; syrup of orange, *a sufficient quantity*. Mix the ginger in powder with the syrup of orange, then add the scammony, and lastly the oil."

This is a stimulating cathartic; and may be given in a dose of from fʒss. to fʒj. but it is seldom ordered."

CONFECTIO SENNÆ.³ Lond. *Confection of Senna.*

"Take of senna leaves, *eight ounces*; figs, *a pound*; tamarind pulp, cassia pulp, the pulp of prunes, of each *half a pound*; coriander seeds, *four ounces*; liquorice root, *three ounces*; refined sugar, *two pounds and a half*. Powder the senna leaves with the coriander seeds, and separate by sifting ten ounces of the mixed powder. Boil the residue with the figs and liquorice root, in four pints of water, until it be reduced one half; then press out and strain the liquor. Evaporate the strained liquor in a water-bath, until a pint and a half only remains of the whole; then the sugar being added, make a syrup. Finally, mix gradually the pulps with the syrup; and having added the sifted powder, mix the whole together."

¹ Electuarium de Baccis Lauri, P. L. 1720.

² Electuarium caryocostinum, P. L. 1720. Electuarium e scammonio, P. L. 1743. Electuarium scammonii, P. L. 1787.

³ Electuarium lenitivum, P. L. 1720. Electuarium Sennæ, P. L. 1787.

ELECTUARIUM SENNÆ COMPOSITUM. *Compound Electuary of Senna.*

"Take of senna leaves, *eight ounces*; coriander seeds, *four ounces*; liquorice root bruised, *three ounces*; figs, pulp of prunes, of each *a pound*; pulp of tamarinds, *half a pound*; refined sugar, *two pounds and a half*; water, *four pounds*. Rub the senna with the coriander, and separate by sifting ten ounces of the mixed powder. Boil the residue with the figs and liquorice root, in the water, down to one half; then express and strain. Evaporate the strained liquor to about a pound and a half. Add the sugar, and gradually the pulps; and lastly, mix in the powder."

ELECTUARIUM SENNÆ. Dub. *Electuary of Senna.*

"Take of senna leaves, in very fine powder, *four ounces*; pulp of prunes, *a pound*; pulp of tamarinds, *two ounces*; molasses, *one pint and a half*; essential oil of carraway, *two drachms*. Boil the pulps with the syrup, to the thickness of honey; then add the powder, and, when the mixture is nearly cold, the oil; finally, mix the whole thoroughly together."

Any of these electuaries is a mild and pleasant purgative, and well adapted for those who are afflicted with habitual costiveness; and for pregnant women. The dose is from ʒj. to ʒiv. or more, taken at bed time.

PULVERES.

POWDERS.

THIS form of preparing medicines is the simplest, and perhaps the least objectionable; but it is not applicable to all the articles of the materia medica. Those remedies, which are very unpleasant to the taste; those which deliquesce rapidly when exposed to the air, or are very volatile; and those which require to be given in large doses, or which are not diffused readily in water, cannot with propriety be administered in the form of powder. Some substances cannot be reduced to powder, unless they be very much dried; and the heat necessary for that purpose alters their properties; even the impalpable form given to powders is injurious to some resinous substances; and we cannot be surprised that a great alteration should be effected in a short time, by the action of the air, on so great an extension of surface as takes place in the operation usually adopted for reducing drugs to fine powder. *Cinchona*, *rhubarb*, *ippecacuanha*, and *guaiacum*, operate much less powerfully in the state of impalpable powder, than when reduced to that degree of fineness only,

which can be effected by simply beating them in a mortar, and passing them through a coarser sieve, than is employed in the former case.

As powders are generally affected by the action of air and light, all powders should be kept in opaque or green glass bottles. The effect of light on the majority of powders is rendered obvious by the labelled sides of clear bottles containing them, which are always turned to the light, becoming encrusted with the powder changed in its colour, while the other side remains clear and transparent.

In forming compound powders, it is necessary to sift the mixture after it has been well triturated. The following general rule for the formation of powders is given by the Dublin College. "Let the substances to be powdered be first dried¹; and then beaten in an iron mortar; then separate the finer powder by shaking it through a hair sieve, and preserve it in close vessels."

PULVIS AL/OES COMPOSITUS. Lond. *Compound Powder of Aloës.*²

"Take of extract of spiked aloës, *an ounce and a half*; guaiac gum-resin, *an ounce*; compound powder of cinnamon, *half an ounce*. Powder the extract of aloës and the guaiac separately; then mix them with the compound powder of cinnamon."

PULVIS AL/OES CUM GUAIACO. Dub. *Powder of Aloës with Guaiac.*

"Take of hepatic aloës, *an ounce and a half*; guaiac gum-resin, *an ounce*; aromatic powder, *half an ounce*. Rub the aloës and the guaiac separately to powder; then mix them with the aromatic powder."

Both the active substances in these powders are ill adapted for this form of preparation; and the addition of the aromatic

¹ Mr. Battley, a respectable druggist in London, has proposed the following method of drying narcotic plants for powders.

Previous to the process of drying the leaves of plants, the same rules must be carefully observed in reviving them which were recommended previous to their being pressed for extracts.

The leaves being in a high state of preservation, and entirely freed from the stalks, and as much as possible from external moisture, must be laid in thin layers in baskets of willow stripped of its bark, in a drying room, from which the light is quite excluded. They should be then exposed to a temperature of not less than from 130 to 140 deg. of Fahrenheit's thermometer for three or four hours, or until the leaves begin to shrivel. They are then to be turned in the same temperature, and the heat kept up for six or eight hours longer, when the operation is generally finished; which is known by the leaves crumbling without much difficulty in the hand. If the process has been in all its parts properly managed, the result will be, that the leaves retain a beautiful green colour, and also in a high degree the medical properties of the plant to which they belong.

To preserve them in this desirable state, oil jars, made perfectly clean and dry, are found to answer best. Place the leaves lightly in the jars, and hermetically seal them. The filled jars ought to be kept in a dry and warm situation.

² Pilulæ de Diambre, P. L. 1720. Pulvis Aloës cum Guaiaco, P. L. 1787.

sufficient to cover the nauseous taste of the aloës. They are warm sudorific cathartics, and may be given in doses of from gr. x. to ʒj. but are seldom ordered.

PULVIS ALOES CUM CANELLA. Dub. *Powder of Aloës with Canella.*

“Take of hepatic aloës, *a pound*; white canella, *three ounces*. Rub them separately to powder, and then mix them.”

This powder is liable to the same objection as the former, although the canella covers the taste better than the aromatic powder. It has been long known in the shops under the name of *Hiera Picra*; and is used as a domestic remedy, infused in wine or spirits. From grs. x. to ʒj. may be given for a dose.

PULVIS ASARI COMPOSITUS. Edin. *Compound Powder of Asarabacca.*

“Take of the leaves of asarabacca, *three parts*; the leaves of marjoram, flowers of lavender, of each *one part*. Rub them together to a powder.”

Dublin.

“Take of dried leaves of asarabacca, *an ounce*; lavender flowers dried, *two drachms*. Rub them together to a powder.”

A few grains of this powder snuffed up the nostrils for several successive evenings at bed-time, excite sneezing and a copious discharge of mucus, which continues to flow on the succeeding days. It has been particularly used in tooth-ach and chronic ophthalmia.

PULVIS CINNAMOMI COMPOSITUS. Lond. *Compound Powder of Cinnamon.*¹

“Take of cinnamon bark, *two ounces*; cardamom seeds, *an ounce and a half*; ginger root, *an ounce*; long pepper, *half an ounce*. Rub them together to a very fine powder.”

PULVIS AROMATICUS. Edin. *Aromatic Powder.*

“Take of cinnamon bark, cardamom seeds, ginger root, of each *equal parts*. Rub them to a very fine powder, which is to be preserved in a well stopped phial.”

Dublin.

“Take of cinnamon bark, *an ounce*; lesser cardamom seeds freed from the husks, ginger, long pepper, of each *an ounce*. Rub them together to a powder.”

These combinations of aromatics are stimulant and carminative, and may be used to promote digestion, and expel flatus in cold phlegmatic habits; but they are more generally employed to give warmth to other compositions. The dose is from gr. viij. to ʒj. given in the form of bolus, or diffused in water.

¹ Species Diambrae sine odoratis, P. L. 1720. Species aromaticae, P. L. 1745. Pulvis aromaticus, P. L. 1787. Poudre aromatique (F.) Gewurpulver (G.) Polvere aromatica (I.)

Official preparations. *Pulvis Aloës compositus*. L. D. *Electuarium aromaticum*. E. *Electuarium opiatum*. E.

PULVIS CONTRAYERVÆ COMPOSITUS. Lond. *Compound Powder of Contrayerva*.¹

"Take of contrayerva root powdered, *five ounces*; prepared shells, *a pound and a half*. Mix them."

This powder is stimulant and sudorific; and is given with advantage in typhoid fevers; the malignant exanthemata; the sinking stage of dysentery; and in atonic gout. The dose is from gr. x. to gr. xl. given either diffused in simple water, or rubbed up with mucilage and mint water.

PULVIS CORNU CERVINI USTI. Dub. *Powder of Burnt Hartshorn*.

"Let pieces of hartshorn be burnt until they become white, then reduce them to a very fine powder."

PULVIS CORNU USTI CUM OPIO. Lond. *Powder of burnt Hartshorn with Opium*.²

"Take of hard opium powdered, *a drachm*; hartshorn burnt and prepared, *an ounce*; cochineal powder, *a drachm*. Mix them."

PULVIS OPIATUS. Edin. *Opiate Powder*.

"Take of opium, *one part*; prepared carbonate of lime, *nine parts*. Rub them together to a fine powder."

Ten grains of either of these powders contain one grain of opium. They are intended chiefly for exhibiting opium in very small doses. The substances used to divide the opium are of no consequence as to the effect of the remedy; and, therefore, the burnt hartshorn being more brittle than the chalk is better fitted for this purpose.

PULVIS CRETÆ COMPOSITUS. Lond. *Compound Powder of Chalk*.

"Take of prepared chalk, *half a pound*; cinnamon bark, *four ounces*; tormentil root, acacia gum, of each *three ounces*; long pepper, *half an ounce*. Rub them separately to fine powder, then mix them."

PULVIS CARBONATIS CALCIS COMPOSITUS. Edin. *Compound Powder of Carbonate of Lime*.

"Take of prepared carbonate of lime, *four ounces*; cinnamon bark, *a drachm and a half*; nutmegs, *half a drachm*. Rub them together to a powder."

The London preparation, owing to the larger proportion of aromatics it contains, and the addition of the tormentil root, is better adapted for checking diarrhoea connected with acidity

¹ Lapis Contrajervæ, P. L. 1720, so named from its having been made into balls.

² Pulvis opiatum, P. L. 1787. Poudre opiate (F.) Opiumspulver (G.) Polvere oppiata (I.)

of the primæ viæ, than the Edinburgh powder, which may be regarded as a simple but grateful antacid. The dose is from gr. v. to ʒj. given generally in the form of mixture rubbed up with mucilage and some distilled water.

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 powdered, *four scruples*. Mix them.”

The addition of opium to the compound powder of chalk renders it more useful in diarrhœa; and from the minute division of the opium, one grain only being contained in two scruples of the powder, it forms an useful opiate powder for children suffering under the irritative diarrhœa of teething. The dose is from ʒj. to ʒj. for adults.

PULVIS JALAPÆ COMPOSITUS. Edin. *Compound Powder of Jalap.*

“Take of powder of jalap root, *one part*; supertartrate of potash, *two parts*. Rub them together to a fine powder.”

The addition of the supertartrate, besides dividing the jalap very minutely, modifies also its purgative operation. This powder is an useful purgative in habitual costiveness: it is also very serviceable to children with tumid bellies, in worm cases, and in dropsy. The dose is from ʒj. to ʒij. for adults.

PULVIS IPECACUANHÆ COMPOSITUS. Lond.
*Dub. Compound Powder of Ipecacuanha.*¹

“Take of ipecacuanha root powdered, hard opium powdered, of each *a drachm*; sulphate of potash powdered, *an ounce*. Mix them.”

PULVIS IPECACUANHÆ ET OPII. Edin. *Powder of Ipecacuanha and Opium.*

“Take of ipecacuanha root powdered, opium, of each *one part*; sulphate of potash, *eight parts*. Rub them together to a fine powder.”

In this powder, the sulphate of potash is intended chiefly to divide the opium mechanically; but it modifies also the action of the opium and ipecacuanha. Compound ipecacuanha powder operates as a powerful sudorific; and is very efficaciously given in acute rheumatism, dropsy, gout, dysentery, and in all cases, whether inflammatory or not, in which full sweating is indicated. The dose is from grs. v. to ʒj. given diffused in water, or in the form of bolus, and assisted by plentiful dilution with tepid fluids; but these must not be drank immediately after taking the powder, as from such a circumstance it is very apt to be rejected by

¹ Poudre d'Ipecacuanha et d'opium (F.) Ipekakuanhapulver (G.) Polvere d'Ipecacuanha ed oppio (I.)

vomiting. Ten grains of this powder contain one grain of opium.

PULVIS KINO COMPOSITUS. Lond. *Compound Powder of Kino.*

"Take of kino, *fifteen drachms*; cinnamon bark, *half an ounce*; hard opium, *a drachm*. Rub them separately to a very fine powder, and then mix."

This is an astringent anodyne powder, now, for the first time, introduced into the Pharmacopœia. The dose is from grs. x. to ʒj. Twenty grains of the powder contain one grain of opium.

PULVIS QUERCUS MARINÆ. Dub. *Powder of Yellow Bladder-wrack.*

"Take of bladder-wrack in flower, *any quantity*. Let it be dried, and freed from the sordes, then exposed to heat in an iron vessel, or a crucible, to which a perforated lid is adapted, until, the vapours ceasing, it becomes obscurely red hot. Reduce the carbonaceous matter which remains, to powder."

This powder is a mixture of soda and charcoal. For its medicinal effects see (*Fucus*, Part ii.)

PULVIS SALINUS COMPOSITUS. Edin. *Compound Saline Powder.*

"Take of pure muriate of soda, sulphate of magnesia, of each *four parts*; sulphate of potash, *three parts*. Dry the salts with a gentle heat, then pulverize them separately, and afterwards rub them together. Preserve the powder in a well stopt phial."

This powder is a simple purgative, and does not appear to possess any peculiar advantages.

PULVIS SCAMMONIÆ COMPOSITUS. Lond. *Compound Powder of Scammony.*¹

"Take of scammony, hard extract of jalap, of each *two ounces*; ginger root, *half an ounce*. Rub them separately to a very fine powder, and then mix them."

PULVIS SCAMMONII COMPOSITUS. Edin. *Compound Powder of Scammony.*

"Take of scammony, supertartrate of potash, of each *equal parts*. Rub them together to a very fine powder."

These powders, although agreeing in name, differ very considerably in their nature. In the first, the activity and the stimulating quality of the scammony are increased by the jalap, while the griping effect of the mixture is in some degree obviated by the ginger. In the second, the addition of the supertartrate of potash detracts from the violence of the oper-

¹ Poudre de Scammonée composée (F.)

ation of the scammony, and renders it less irritating; although, at the same time, it renders it more certain. The dose of the first is from grs. x. to grs. xv.; that of the second, from grs. x. to ʒss. They are chiefly used in hydropic and worm cases, and to remove mucous obstructions.

PULVIS SCILLÆ. Dub. *Powder of Squill.*

“Let squill roots (bulbs) freed from their membranous integuments and cut in transverse slices, be dried upon a sieve with a low degree of heat; and then reduce it to powder, which must be preserved in well stopped glass phials.”

PULVIS SENNÆ COMPOSITUS. Lond. *Compound Powder of Senna.*¹

“Take of senna leaves, supertartrate of potash of each two ounces; scammony, half an ounce; ginger-root, two drachms. Reduce to very fine powder, the scammony by itself, and the other ingredients together; then mix the whole.”

This powder is hydragogue and cathartic; but it is an inconvenient form of preparation, owing to the bulk of the dose, which is very considerable, although from ʒj. to ʒj. only in weight.

PULVIS SPONGIÆ USTÆ. Dub. *Powder of burnt Sponge.*

“Let sponge cut into small pieces be beaten so as to free it from little stones; then burn it in a covered iron vessel, until it become black and friable; finally, reduce it to powder.”

PULVIS ALUMINIS COMPOSITUS. Edin. *Compound Powder of Alum.*

“Take of sulphate of alum, four parts; kino, one part. Rub them together to a fine powder.”

This is a powerful astringent powder, and is sometimes used internally in menorrhagia and diarrhœa; but is more generally employed as an external application. The dose is from grs. x. to grs. xv.; but it must be taken in the dry state, as the kino is decomposed by the alum, when a fluid vehicle is employed.

PULVIS TRAGACANTHÆ COMPOSITUS. Lond. *Compound Powder of Tragacanth.*²

“Take of tragacanth powdered, acacia gum powdered, starch, of each an ounce and a half; refined sugar; three ounces. Rub the starch and the sugar together to a powder; then add the tragacanth and the acacia gum, and mix the whole together.”

In this composition the starch might well be omitted, as it is insoluble in cold water. This compound powder is effica-

¹ Poudre composée de Senna (F.) Polvere di Senna composta (I.)

² Poudre composée de Tragacanthæ (F.) Tragacanthæ Gummi pulver (G.) Polvere di Tragacantha composta (I.)

ciously used as a demulcent in hectic fever, and to allay the tickling cough of catarrh: in gonorrhœa and strangury it is given combined with nitre; and in dysentery, with ipecacuanha powder. The dose is from 3fs. to ʒiij. mixed in water or any bland fluid.

PILULÆ.

PILLS.

PILLS are masses of a consistence sufficient to preserve a round form, yet not so hard as to be of too difficult solution in the stomach. This form of preparation is particularly adapted for medicines which have a very nauseous taste or flavour, and such as operate in minute doses. Extracts, when not too hard, may be formed into pills without any addition; but more generally they are composed of either vegetable, or earthy, or metallic powders, combined by means of syrup into a coherent mass. Salts also may be formed into pills, except such as are deliquescent; and when efflorescent salts are used, they should be first freed from the water of crystallization, for the pills formed with uneffloresced salts which are apt to effloresce, fall into powder as they dry. The masses, which are ordered to be kept prepared for the formation of pills, require to be preserved in covered pots, wrapped in bladders, and occasionally moistened. When they are to be formed into pills, a given portion of the mass is rolled into a cylinder, the length of which is regulated by the number of pills into which it is to be divided; and the division is effected either as equally as possible by the hand, or by a machine invented for the purpose. (See *Instruments*, Part i.) After the round form is given to each of the pills, by rolling the divided pieces between the fingers, they are covered by some dried powder, as subcarbonate of magnesia or starch, to prevent them from adhering. With the same intention pills were formerly gilded; but as simple dry powders answers all the purposes of this covering, it is now altogether laid aside.

PILULÆ ALOES COMPOSITÆ. Lond. *Compound Aloetic Pills.*¹

“Take of extract of spiked aloës powdered, *an ounce*; extract of gentian, *half an ounce*; oil of carraway, *forty minims*; syrup, *a sufficient quantity*. Beat them together until they combine into an uniform mass.”

¹ *Pilules d'Aloë composée (F.) Pillole d'Aloë composite (I.)*

PILULÆ ALÖETICÆ. Edin. *Alöetic Pills.*

"Take of Socotorine alöes in powder, soap, of each *equal parts*. Beat them with simple syrup, so as to make a mass fit for forming pills."

PILULÆ ALOES CUM ZINGIBERE. Dub. *Pills of Alöes and Ginger.*

"Take of hepatic aloes, *an ounce*; ginger root in powder, *a drachm*; soap, *half an ounce*; essential oil of peppermint, *half a drachm*. Let the aloes and the ginger be rubbed together to a powder; then add the soap and the oil so as to form a mass."

In the London preparation the quantity of extract of gentian ordered is too large; for, owing to its re-action on the aloes, the mass becomes rather too soft to form into pills: at all events no syrup is required in this instance. The soap ordered in the two other formulæ is well adapted for giving consistence and form to the aloes. This is an useful pill, and is advantageously used for obviating the habitual costiveness of the sedentary, and of leucophlegmatic habits. The dose is from grs. x. to grs. xv. or more.

PILULÆ ALOES ET ASSAFÆTIDÆ. Edin. *Pills of Alöes and Assafætida.*¹

"Take of Socotorine aloes in powder, assafætida, soap, of each, *equal parts*. Beat them into a mass with mucilage of gum arabic."

These pills are anodyne and cathartic, allaying any irritability of the bowels, at the same time that they open them freely. They have been found extremely useful in dyspepsia attended with flatulence. The dose is grs. x. given twice a day.

PILULÆ ALOËS CUM MYRRHÆ. Lond. *Pills of Alöes with Myrrh.*²

"Take of extract of spiked aloes, *two ounces*; saffron, myrrh, of each *an ounce*; syrup, *a sufficient quantity*. Rub separately to powder the aloes and the myrrh; then beat all the ingredients together until they form an uniform mass."

Dublin.

"Take of hepatic aloes, *an ounce*; myrrh, *half an ounce*; saffron *two drachms*; essential oil of carraway, *half a drachm*. Rub the myrrh and the aloes separately to powder, and beat the whole together into a mass.

PILULÆ ALÖES ET MYRRHÆ. Edin. *Pills of Alöes and Myrrh.*

"Take of Socotorine aloes *four parts*; myrrh *two parts*; saffron *one part*. Beat them into a mass with simple syrup."

¹ Pilules d'Aloë avec assafœtida (F.) Pillules Bloeteche con assafetida (L.)

² Pilulæ Rufi seu communes, P. L. 1720 Pilules d'Aloë avec la Myrrh (F.) Pillote Aloetische con Mirra (L.)

These pills have been long employed to stimulate and open the bowels in chlorotic, hypochondriacal, and cachectic habits. The dose is from grs. x. to ʒj. given twice a day.

PILULÆ AMMONIARETI CUPRI. Edin. *Pills of Ammonia ret of Copper.*¹

“Take of ammonia ret of copper rubbed to fine powder, sixteen grains; crumb of bread, four scruples; water of carbonate of ammonia, a sufficient quantity. Beat them into a mass, and divide it into thirty-two equal pills.”

This is a convenient form for the exhibition of the ammonia ret of copper, half a grain of which is contained in each of the pills. They are given in epilepsy and other spasmodic diseases. One pill given night and morning is sufficient at first; but the number may be gradually increased till five be taken for a dose.

PILULÆ CAMBOGIÆ COMPOSITÆ. Lond. Edin. *Compound Pills of Gamboge.*

“Take of gamboge in powder, extract of spiked aloes in powder, compound powder of cinnamon, of each a drachm; soap, two drachms. Mix the powders together; then add the soap, and beat the whole together into an uniform mass.”

This is considerably more active than the aloetic pills. The dose is from grs. x. to ʒj. given at bed-time in obstinate costiveness.

PILULÆ COLOCYNTHIDIS COMPOSITÆ. Edin. *Compound Colocynth Pills.*

“Take Socotorine aloes, scammony, of each eight parts; colocynth pulp, four parts; sulphate of potash, oil of cloves, of each one part. Beat the extract, gum resin, and sulphate together into powder, then, with the colocynth pulp rubbed to fine powder, mix them with the oil, and, finally, beat the whole into a mass with mucilage of gum.”

Dublin.

“Take of colocynth pith, half an ounce; hepatic aloes, scammony, of each one ounce; Castile soap, two drachms; oil of cloves, one drachm. Pulverize separately the aloes, scammony, and colocynth, then triturate them with the soap and oil, and form them into a mass by means of syrup.”

Both these are excellent forms of purgative pills. They are more powerful in their operation than the other aloetic pills; and do not so soon lose their power when taken for any considerable length of time in habitual costiveness.

PILULÆ FERRI COMPOSITÆ. Lond. *Pills of Iron with Myrrh.*

¹ Pilules cuivreuses de Swédiaur (F.)

"Take of myrrh in powder, *two drachms*; subcarbonate of soda, sulphate of iron, sugar, of each *a drachm.* Rub the myrrh with the subcarbonate of soda; then having added the sulphate of iron, rub again; and lastly, beat the whole into an uniform mass."

This is an useful emmenagogue pill, similar in its properties to Griffith's mixture. The dose is from grs. x. to ʒj. given twice or three times a day.

PILULÆ GAL'BANI COMPOSITÆ. Lond. *Compound Pills of Galbanum.*¹

"Take of galbanum, *an ounce*; myrrh, sagapenum, of each *an ounce and a half*; assafoetida, *half an ounce*; syrup, *a sufficient quantity.* Beat them together into an uniform mass."

PILULÆ ASSAFOETIDÆ COMPOSITÆ. Edin. *Compound Assafoetida Pills.*

"Take of assafoetida, galbanum, myrrh, of each *eight parts*; purified oil of amber, *one part.* Beat them into a mass with simple syrup."

PILULÆ MYRRHÆ COMPOSITÆ. Dub. *Compound Pills of Myrrh.*

"Take of assafoetida, myrrh in powder, galbanum, of each *an ounce*; oil of amber, *half a drachm.* Rub them together, and make them into a mass with simple syrup."

These preparations are useful antispasmodics and emmenagogues; and are given with advantage in chlorosis, hysteria, and hypochondriasis. The dose is from grs. x. to ʒj. taken every night at bed-time.

Of the three appellations employed by the Pharmacopœias, that of the Edinburgh is the least objectionable, the assafoetida being undoubtedly the most powerful article.

PILULÆ HYDRARGYRI. Lond. Dub. *Mercurial Pills.*²

"Take of purified mercury, *two drachms*; confection of red roses, *three drachms*; liquorice root in powder, *a drachm.* Rub the mercury with the confection until the globules disappear; then add the liquorice root, and beat the whole into an uniform mass."

Edinburgh.

"Take of purified mercury, conserve of the red rose, of each *an ounce*; starch, *two ounces.* Rub the mercury with the conserve in a glass mortar until the globules entirely disappear, adding, if necessary, a little mucilage of gum arabic; then add the starch, and with a little water beat the whole into a mass,

¹ Pilule gummosæ, P. L. 1720. Pilules de Galbanum composée (F.) Pillole di Galbano composta (I.)

² Pilules mercuriales (F.) Pillole mercuriale (I.)

which is to be directly divided into four hundred and eighty equal-sized pills."

One grain of mercury is contained in four grains of the mass, made according to the London and Dublin formulæ, and in three grains according to the Edinburgh.

In these preparations the mercury is first minutely divided by the viscosity of the conserve, the substance with which it is triturated: and formerly it was believed that this mechanical division was all that was effected by the trituration. It is now, however, generally, and with much probability, supposed that the metal is oxidized; and that the great extension of surface, and in some degree the substance used in the trituration, facilitate this effect. Syrup, honey, mucilage, soap, guaiac, and other matters, have been occasionally employed; but the Colleges have agreed in preferring conserve of roses; and it is not improbable that the operation is shortened by the weak acid which the conserve contains. On the continent the oil of eggs has been employed for dividing mercury¹, and certainly no substance so rapidly assists in producing the desired effect as this oil, when it has been kept for some time. In the above preparations, therefore, the mercury is nearly in the state of the black oxide, and on this combination of oxygen its activity as a remedy altogether depends. The more assiduously the trituration is continued, so as to bring the surfaces of the globules of mercury quickly and repeatedly into contact with the air, the more perfect is the preparation. The oxidization of the whole of the globules, or the extinction or killing of the mercury, as it is termed in the common language of the laboratory, is known to be completed, when on rubbing a small portion of the mass with the point of the finger on a piece of clean paper, no metallic globules are perceptible. The mass must be then immediately formed into pills, as it very rapidly becomes too hard, if allowed to remain.

Medical properties and uses. — These pills are stimulant and antisyphilitic, and are the most common form of preparation under which mercury is exhibited for the cure of venereal affections, being much less liable to act on the bowels than any of the other forms. The common dose is grs. vj. to grs. viij. or two pills, given twice a day until the mouth be affected. Larger doses are apt to excite purging.

PILULÆ HYDRARGYRI SUBMURIATIS COMPOSITÆ. Lond. Edin. *Pills of Submuriate of Mercury.*

"Take of submuriate of mercury (calomel), precipitated sulphuret of antimony, of each a drachm; guaiac gum-resin,

¹ Vide *Lond. Med. Repository*, vol. v. p. 166.

two drachms. Rub the submuriate of mercury with the precipitated sulphuret of antimony, then with the guaiac, and add a sufficient quantity of mucilage of gum to give the mass a proper consistence."

This preparation was introduced into practice by Dr. Plummer, and admitted into the Edinburgh Pharmacopœia under the name of Plummer's pill. It was, however, afterwards expunged; but as it continued to be much used in practice, the London College has now given it a place in its Pharmacopœia. It is a very useful alterative in lepra, in secondary syphilis affecting the skin, and in other cutaneous diseases. The dose is from grs. v. to grs. x. given night and morning.

PILULÆ RHEI COMPOSITÆ. Edin. *Compound Rhubarb Pills.*¹

"Take of rhubarb root in powder, *one ounce*; Socotorine aloes, *six drachms*; myrrh, *half an ounce*; volatile oil of peppermint, *half a drachm*. Beat them into a mass with syrup of orange peel."

This is a warm, stomachic, laxative pill, very useful for obviating costiveness, and at the same time giving tone to the bowels in dyspepsia and hypochondriasis. The dose is from grs. x. to ʒj. given twice a day.

PILULÆ SAPONIS CUM OPIO. Lond. *Pills of Soap and Opium.*²

"Take of hard opium powdered, *half an ounce*; hard soap, *two ounces*. Beat them together into an uniform mass." Five grains contain one grain of opium.

PILULÆ OPIATÆ; olim, PILULÆ THEBAICÆ. Edin. *Opiate Pills*; formerly, *Thebaic Pills*.

"Take of opium, *one part*; extract of liquorice, *seven parts*; pimenta berries, *two parts*. Mix the opium and the extract, separately softened with diluted alcohol, and beat them into a pulp; then add the Jamaica pepper rubbed to powder, and beat the whole into a mass." Ten grains contain one grain of opium.

PILULÆ E STYRACE. Dub. *Storax Pills*.

"Take of purified storax, *three drachms*; soft purified opium, saffron, of each *a drachm*. Mix them well together by beating." Five grains contain one grain of opium.

The substances with which the opium is combined in these pills do not interfere with its operation as an anodyne, but are intended chiefly to cover its odour and taste in cases where the patient or his friends have an objection to opium; and as it is also sometimes necessary that it should not appear even

¹ Pilules de Rhubarbe composée (F.) Pillole di Rhabarbaro composta (I.)

² Pilules d'Opium (F.) Pillole d'Oppio (I.)

in the prescription, the name adopted by the Dublin College is preferable to the others. The dose of the three preparations differs, and must be regulated by the quantity of opium contained in that one which is adopted.

PILULÆ SCILLÆ COMPOSITÆ. Lond. *Compound Squill Pills.*

"Take of fresh squill root (bulb) dried and powdered, *one drachm*; ginger root powdered, hard soap, of each *three drachms*; ammoniacum powdered, *two drachms*. Mix the powders together; then beat them with the soap, as much syrup being added as will give them a proper consistence."

PILULÆ SCILLITICÆ. Edin. *Squill Pills.*

"Take of squill root (bulb) dried, and rubbed to a fine powder, *one scruple*; ammoniacum, cardamom seeds powdered, extract of liquorice, *one drachm*. Beat them with syrup into a mass."

PILULÆ SCILLÆ CUM ZINGIBERE. Dub. *Pills of Squill with Ginger.*

"Take of powder of squill, *a drachm*; ginger root in powder, *two drachms*; essential oil of anniseed, *ten drops*. Beat them together, and form them into a mass with jelly of soap."

These pills are useful expectorants in chronic catarrh, dyspnoea, and asthma; and combined with calomel and digitalis in hydropic affections. They are liable, however, to the same objections as the squill powder, the efficacy of the squill being much injured by keeping in either form; and it is perhaps better that it should be always given under an extemporaneous form, except when the tincture is used. The dose is from grs. x. to ʒj. given three or four times a day.

PILULÆ SUBCARBONATIS SODÆ. Edin. *Pills of Subcarbonate of Soda.*

Take of exsiccated subcarbonate of soda, *four parts*; hard soap, *three parts*. Beat into a mass with simple syrup.

This preparation was recommended by the late Dr. Beddoes; and has been found occasionally useful.

PILULÆ SULPHATIS FERRI COMPOSITÆ. Edin. *Compound Pills of Sulphate of Iron.*

"Take of sulphate of iron reduced to powder, *one ounce*; extract of chamomile flowers, *one ounce and a half*; oil of peppermint, *a drachm*. Beat into a mass with simple syrup."

This is a useful tonic pill, and may be given with advantage in dyspepsia and other affections in which steel is indicated. A five grain pill will contain two grains and a half of the sulphate of iron.

* Pilules de Scille (F.) Pillole Squillitiche (I.)

TROCHISCI.

TROCHES.

THESE are little cakes or tablets composed of powders combined with sugar and mucilage. They are hard and dry, but readily dissolve in the mouth, for which purpose they are chiefly intended; and therefore, such remedies only as are designed to produce a local effect are given in this form. They are of little importance as remedies; and the preparation of them ought to be left entirely to the confectioner; or they should be altogether rejected from the Pharmacopœia, as has been done by the London and the Dublin Colleges.

TROCHISCI CARBONATIS CALCIS. Edin. *Troches of Carbonate of Lime.*

"Take of prepared carbonate of lime, *four ounces*; acacia gum, *an ounce*; nutmegs, *one drachm*; refined sugar, *six ounces*. Rub them to powder, and form them by means of water into a mass fit for making troches."

"These troches are intended as antacids; but in the state of the stomach when it requires the use of these remedies, the effect of the carbonate of lime is counteracted by the sugar."

TROCHISCI CARBONATIS MAGNESIÆ. Edin. *Troches of Carbonate of Magnesia.*

"Take of carbonate of magnesia, *six ounces*; refined sugar, *three ounces*; nutmegs, *a scruple*. Beat them into powder and form them into troches with mucilage of tragacanth."

These are used in the same cases as the former; and are more serviceable when the bowels are confined.

TROCHISCI GLYCYRRHIZÆ GLABRÆ. Edin. *Troches of Liquorice.*

"Take of extract of liquorice, gum arabic, of each *one part*; refined sugar, *two parts*; boiling water, *a sufficient quantity*. Dissolve and strain, then evaporate the solution, by a gentle heat, to a proper consistence for forming troches."

These troches are demulcent, and from the viscid nature of the extract of liquorice are well adapted for allaying the tickling irritation which induces coughing; but they are not more useful than the simple extract of liquorice refined by straining and inspissation, such as is found in the shops under the name of refined liquorice.

TROCHISCI GLYCYRRHIZÆ CUM OPIO. Edin. *Liquorice Troches with Opium.*

"Take of opium, *two drachms*; tincture of balsam of Tolu, *half an ounce*; simple syrup, *eight ounces*; extract of liquorice, softened by hot water, gum arabic in powder, of each *five*

ounces. First rub the opium well with the tincture; then add gradually the syrup and the extract; afterwards sprinkle in the powdered gum arabic; lastly, dry the mass, and form it into troches, each weighing ten grains."

These troches are used for the same purposes as the former; and from the opium they contain are more efficacious in allaying tickling cough. Six troches contain one grain of opium; and from six to ten may be taken in twenty-four hours.

TROCHISCI GUMMOSI. Edin. *Gum Troches.*

"Take of gum arabic, *four parts*; starch, *one part*; refined sugar, *twelve parts*. Rub the whole to powder, and form it into a mass with rose water fit for forming troches."

These troches are simple demulcents, and answer sufficiently well for allaying the tickling irritation of the fauces which excites coughing.

TROCHISCI NITRATIS POTASSÆ. Edin. *Troches of Nitrate of Potash.*

"Take of nitrate of potash, *one part*; refined sugar, *three parts*. Beat them to powder, and form them into a mass fit for forming troches by means of mucilage of tragacanth."

These troches afford an agreeable form of taking nitre in the dry state; and are useful for cooling the mouth in salivations, and in stopping the progress of inflammatory sore-throat, when taken at its commencement. They may also be used as a general refrigerant in fevers, diluting largely during their use. The dose is one or two taken every second or third hour.

PRÆPARATA EX ANIMALIBUS.

PREPARATIONS FROM ANIMALS.

THE substances of this division are few in number, and are not remedies of much efficacy.

ADEPS PRÆPARATA. Lond. *Prepared Lard.*

"Cut the fat into small fragments; then melt it by a gentle heat, and press it through linen."

ADEPS SUILLUS PRÆPARATUS. Dub. *Prepared Hog's Lard.*

"Let fresh lard, cut into small pieces, be melted by a moderate heat, and strained by pressing it through a linen cloth.

"Lard, which is prepared by the dealers, and is preserved with salt, is to be melted with twice its weight of boiling water, and the mixture well stirred: it is then to be allowed to cool, when the lard may be separated."

* *Adeps Suillæ preparata*, P. L. 1787.

SEVUM PRÆPARATUM. Lond. *Prepared Suet.*¹

"Cut the suet in pieces; then melt it by a gentle heat, and press it through linen."

The properties of lard and suet have been already detailed. (*Part ii.*) The above processes are intended to purify them; but, in order to obtain them very pure, it is necessary that they be washed in water until the water come off colourless, before they be melted. Any water that may remain attached to the fat is evaporated during the melting; and that it is all evaporated, is known by throwing a little of the melted fat into the fire, when it will crackle if any water be present. The heat must not be raised above 97°, the melting point of fat; as otherwise the fat is decomposed, rendered acrid, and assumes a yellow colour. This purification is seldom attempted by the apothecary, as both kinds of fat can be procured very well purified from the dealers. To keep lard clean, and preserve it from the action of the air, it is generally run into bladders while in the liquid state.

CORNU USTUM. Lond. *Burnt Hartshorn.*²

"Burn pieces of hart's horn in an open fire until they become thoroughly white; then powder them, and prepare them in the manner directed for the preparation of chalk."

From the title given to this preparation, one might be led to suppose that any kind of horn would serve as a substitute for hart's horn, which is intended to be designated: but the properties of hart's horn are more similar to those of bone than of the horns of other animals, the chief difference being in the proportion of cartilage, which is greater in the hart's horn than in bone.

In performing this operation the fire must not be too violent, as the horn is apt to suffer a species of vitrification of the surface, when exposed to a very strong heat, which prevents the internal parts from being completely burnt. The residue of 100 parts of hart's horn consists, after the burning, of 57.5 of phosphate of lime, one of carbonate of lime, and a minute portion of phosphate of magnesia.

Medical properties and uses.—Phosphate of lime is perfectly inert when taken into the stomach; and the analysis of burnt hart's horn has clearly proved, that the former idea of its antacid properties was erroneous. It has been proposed as a remedy in rickets and mollities ossium; but we cannot easily conceive how it can be taken up by the absorbents, and thrown upon the bones; and experience has not yet confirmed

¹ *Sevum Ovillum preparatum*, P. L. 1787.

² *Cornu Cervi ustum*, P. L. 1787.

the theory, nor indeed utility, of burnt hart's horn for any purpose as a remedy.

Officinal preparation. *Mistura Cornu usti. L.*

SPONGIA USTA. Lond. *Burnt Sponge.*

"Cut sponge into small pieces and bruise it, in order to free it from any adhering extraneous substances; then burn it in a covered iron vessel, until it become black and friable; finally, rub it to a very fine powder."

The properties of fresh sponge have been already noticed: when burnt, the residue consists of carbonate and phosphate of lime, subcarbonate of soda, and charcoal. The principal active ingredient is the subcarbonate of soda, but it is asserted that a mixture of this principle and charcoal does not produce the effects of burnt sponge.

Medical properties and uses. — Burnt sponge is tonic, deobstruent, and antacid. It has been much recommended in bronchocele, scrophulous affections, and herpetic eruptions: and I have witnessed its efficacy in scirrhus testicle, when given in combination with cinchona bark. The dose is from ʒj. to ʒij. mixed into the form of an electuary, with powdered cinnamon and honey. In bronchocele the patient is directed to swallow the portion of electuary very slowly, from a supposition that some local effect is produced.

TESTÆ PRÆPARATÆ. Lond. *Prepared Shells.*

"Wash the shells with boiling water, having previously freed them from extraneous matters, then prepare them in the manner directed for the preparation of chalk."

OSTREARUM TESTÆ PRÆPARATÆ. Dub. *Prepared Oyster Shells.*

"These are to be prepared in the same manner as chalk."

OVORUM TESTÆ PRÆPARATÆ. Dub. *Prepared Egg Shells.*

"These are to be prepared in the same manner as chalk."

Both in oyster and egg-shells the predominating ingredient is carbonate of lime, and therefore these prepared shells do not differ from chalk, except in containing a small portion of gelatin or albumen. But as this does not in any degree affect their medicinal properties, which are exactly the same as those of chalk, they might well be spared from the list of preparations. The dose is from grs. x. to ʒij. or more.

EMPLASTRA.

PLASTERS.

THESE are solid, tenacious compounds, adhesive in the ordinary heat of the human body. The base of the majority of

plasters is a chemical combination of the semivitreous oxide of lead and oil; but some of them owe their consistence to wax and resin; and others contain no oily nor fatty matter whatsoever. Deyeux proposes¹ to confine the name of plasters to the combinations of metallic oxides with oils or fat; and to give those not containing oxides, the term solid ointments; but this definition would include among the plasters some of the ointments, and exclude many of the plasters.

Plasters should not adhere to the hand when cold; they should be easily spread when heated; and should remain tenacious and pliant after they are spread; but should not be so soft as to run when heated by the skin. All plasters become too consistent and brittle when long kept; but in this case, those which are unctuous may be re-melted by a gentle heat, and some oil added to them. They are usually formed into rolls, each of which is wrapped in paper; and when to be used, they are melted and spread on leather, calico, linen, or silk. Those that contain metallic oxides ought to be melted by boiling water, for in a greater degree of heat the fatty matter is apt to reduce the oxide.

Plasters are employed as local remedies to answer various indications. When the materials of which they are formed are soft and bland, they are used simply as coverings to sores and abraded surfaces, to protect them from the action of the air, and give support to the parts; but in many instances they contain acrid and stimulating substances, and operate as rubefacients, or as blisters.

EMPLASTRUM AMMONIACI. Lond. Edin. *Ammoniac Plaster.*

"Take of purified ammoniac, *five ounces*; acetic acid, (distilled vinegar,) *half a pint*. Dissolve the ammoniac in the vinegar, then evaporate the solution in an iron vessel placed in a water-bath, constantly stirring until it acquire a proper consistence."

This plaster is stimulant and resolvent. It is applied to scrophulous tumours and white swellings; and sometimes over the scalp, in tinea capitis.

EMPLASTRUM AMMONIACI, CUM HYDRARGYRO. Lond. *Ammoniac Plaster with Mercury.*

"Take of purified ammoniac, *a pound*; purified mercury, *three ounces*; sulphureted oil, *a fluid drachm*. Rub the mercury with the sulphureted oil until the globules disappear; then add gradually the ammoniac previously melted, and mix the whole together."

¹ *Annales de Chimie*, xxxiii. 52.

Dublin.

"Take of pure gum ammoniac, *a pound*; purified mercury, *three ounces*; turpentine, *two drachms*. Rub the mercury with the turpentine until the globules disappear; then add gradually the ammoniac previously melted, and melt the whole together."

In these plasters the mercury is in the state of oxide, with a minimum of oxygen. They are powerful discutients, and are applied to indurated glands, hydarthus, nodes, tophi, and indolent tumours.

EMPLASTRUM AROMATICUM. Dub. *Aromatic Plaster.*

"Take of frankincense, *three ounces*; yellow wax, *half an ounce*; cinnamon bark in powder, *six drachms*; oil of pimenta, oil of lemons, of each *two drachms*. Melt the frankincense and the wax together, and strain the mixture; when it thickens by cooling, mix with it the powder of cinnamon previously rubbed with the oils, and form them into a plaster."

This plaster, which is an elegant stimulant, is applied on the region of the stomach in dyspepsia, and increased irritability of that viscus, to allay pain and vomiting; and to expel flatus. As the oils are very volatile, it must be spread with the thumb without being melted. It requires to be frequently renewed, and is consequently not very adhesive.

EMPLASTRUM ASSAFCETIDÆ. Edin. *Assafoetida Plaster.*

"Take of plaster of semivitreous oxide of lead, assafoetida, of each *two parts*; galbanum, yellow wax, of each *one part*."

This plaster is sometimes applied over the umbilical region, in flatulence and hysteria.

EMPLASTRUM CALEFACIENS. Dub. *Warm Plaster.*

"Take of plaster of cantharides, *one part*; Burgundy pitch, *seven parts*. Melt them together with a moderate heat, and mix them so as to form a plaster."

This plaster is stimulant and rubefacient, and is applied with advantage in catarrh, hooping-cough, sciatica, and local pains.

EMPLASTRUM CERÆ. Lond. *Wax Plaster.*

"Take of yellow wax, prepared suet, of each *three pounds*; yellow resin, *a pound*. Melt them together, and strain."

EMPLASTRUM SIMPLEX. Edin. *Simple Plaster.*

"Take of yellow wax, *three parts*; mutton suet, white resin, of each *two parts*."

These plasters were originally intended for dressing blistered parts, with the view of promoting a discharge; but, owing to the pain and irritation they induce, they are now seldom employed. They may be spread with a hot iron.

Official preparation. *Emplastrum Lyttæ*. L.

EMPLASTRUM CUMINI. Lond. *Cumin Plaster*.

"Take of cumin seeds, carraway seeds, laurel berries, of each *three ounces*; dried pitch, *three pounds*; yellow wax, *three ounces*. Melt the pitch and the wax together, then add the other ingredients in powder, and mix."

This plaster is stimulant and discutient. It is applied to the hypogastric region in flatulence and a cold feeling of the bowels, and to indolent tumours.

EMPLASTRUM GALBANI COMPOSITUM. Lond. *Compound Galbanum Plaster*.

"Take of purified galbanum, *eight ounces*; plaster of lead, *three pounds*; common turpentine, *ten drachms*; resin of the spruce-fir powdered, *three ounces*. Having melted the galbanum and the turpentine together, mix in first the resin, and then the plaster of lead previously melted by a slow fire, and mix the whole together."

EMPLASTRUM GUMMOSUM. Edin. *Gum Plaster*.

"Take of plaster of semivitreous oxide of lead, *eight parts*; ammoniac gum-resin, galbanum, yellow wax, of each *one part*. Add the gum resins to the melted plaster and wax, and mix."

EMPLASTRUM GALBANI. Dub. *Plaster of Galbanum*.

"Take of litharge plaster, *two pounds*; galbanum, *half a pound*; yellow wax sliced, *four ounces*. To the galbanum melted by heat add the litharge plaster and the wax; then melt the whole together by a gentle heat."

These plasters are stimulant and suppurative. They are applied with advantage to scrophulous tumours; to joints which have been long affected with arthritic pains; and to the loins in rickets. As a suppurative they are applied to indolent tumours; and to reduce the induration which often remains around abscesses, after they are discharged.

EMPLASTRUM HYDRARGYRI. Lond. *Mercurial Plaster*.

"Take of purified mercury, *three ounces*; sulphureted oil, *a fluid drachm*; plaster of lead, *a pound*. Rub the mercury with the sulphureted oil until the globules disappear; then add by degrees the lead plaster melted, and mix the whole."

Edinburgh.

"Take of olive oil, resin, of each *one part*; mercury, *three parts*; plaster of semivitreous oxide of lead, *six parts*. Rub the mercury with the oil and the resin previously melted together and cooled, until the globules disappear; then add gradually the plaster of semivitreous oxide of lead melted, and let the whole be carefully mixed together."

1 Quacksilberplaster (G.)

The mercury in these plasters is in the state of oxide, with a minimum of oxygen; and the sulphureted oil, ordered by the London College, is intended to diminish the labour required for this oxidizement of the metal. The plasters are powerful discutients, and are applied to buboes, venereal tumours, nodes, when they are not very painful to the touch, and indurations: they are also applied to joints affected with obstinate syphilitic pains.

EMPLASTRUM LYTTÆ. Lond. *Blistering Plaster.*

“Take of blistering flies reduced to a very fine powder, *a pound*; wax plaster, *a pound and a half*; prepared lard, *a pound*. Melt the plaster and the lard together, and having removed them from the fire, when the mixture is just about to become solid, sprinkle in the blistering flies, and mix the whole together.”

EMPLASTRUM CANTHARIDIS VESICATORIÆ. Edin. *Blistering Plaster.*

“Take of mutton suet, wax, white resin, blistering flies reduced to a very fine powder, of each *equal weights*. Mix the powder with the other articles previously melted together, and removed from the fire; then stir until the mixture stiffens in cooling.”

EMPLASTRUM CANTHARIDIS. Dub. *Blistering Plaster.*

“Take of purified yellow wax, mutton suet, of each *a pound*; yellow resin, *four ounces*; blistering flies in fine powder, *a pound*. Melt the wax, the suet, and the resin together, and a little before they concrete in becoming cold, sprinkle in the blistering flies, and form the whole into a plaster.”

These plasters are of a moderately soft consistence, so as to admit of being spread without the assistance of heat, which destroys the acrimony and epispastic property of the flies; but they seldom fail of raising a blister, if the flies be good, and have not been added when the other ingredients were too hot. When they are to be used, a piece of leather of a proper shape and size is first spread with adhesive plaster, and over this the blistering plaster is extended of a moderate degree of thickness, and as smooth as possible, by the means of the thumb; a proper margin being left, so as to enable it to adhere closely to the skin. There is, however, an evident waste of flies, as those flies only which are on the surface of the plaster, when it is spread, act on the skin; and it has been suggested by Parmentier², that the same effect would be more economically produced by sprinkling the powdered flies on a piece of farinaceous paste,

¹ Emplâtre de Cantharides (F.) Kanthariden pflaster (G.) Empiastro di Cantarelle (I.)

² *Annales de Chimie*, xlviii.

spread on linen or leather. Blistering plasters require to remain applied for twelve hours to raise a perfect blister; they are then to be removed, the vesicle is to be cut at the most depending part, and without removing the cuticle, the vesicated part is to be dressed with simple cerate or spermaceti ointment; and the old cuticle allowed to remain until a new one is formed under it, when it peels off, and the whole is healed in the course of a few days. The application of these plasters, however, is sometimes attended with strangury and bloody urine, which arise from the active principles of the insect being absorbed, and irritating the kidneys and urethra. This effect is very much increased if the blister be applied over an abraded surface, as, for example, on the head immediately after it has been shaved; and it also occurs if the plaster remain too long applied. To prevent strangury, camphor has been recommended to be mixed with the blistering composition, but it has no good effect; and it is better obviated by copious dilution with milk, or mucilaginous fluids, and fomentations of warm milk and water to the blistered part, after the removal of the plaster. When the head is the part intended to be blistered, it should be shaved at least ten hours before the plaster is applied; and in all cases it is perhaps a good rule to interpose a piece of thin gauze between the vesicatory and the skin, wetted with vinegar, and applied smooth and very close over the plaster.

In some diseases of irritation, particularly in children, the blistered part, instead of healing kindly, becomes a spreading sore; the cutis vera is destroyed, and the part cannot be healed until the irritability of habit which induced this unpleasant state is allayed. In such cases, the best local application is a warm emollient poultice; and bathing the denuded surface frequently with tepid milk and water; while at the same time cinchona bark is internally administered.

EMPLASTRUM CANTHARIDIS VESICATORIE COMPOSITUM. Edin. *Compound Plaster of Spanish Flies.*

“Take of Venice turpentine, *eighteen parts*; Burgundy pitch, blistering flies, of each *twelve parts*; yellow wax, *four parts*; subacetite of copper, *two parts*; white mustard seeds, black pepper, of each *one part*. Melt the Burgundy pitch and the wax, and add to them the turpentine. While these remain still warm, after being melted, sprinkle in the other ingredients reduced to fine powder, and mix them, stirring constantly, so as to form a plaster.”

This plaster is intended to raise a blister more quickly than the former; and hence is adapted for cases of gout and cramps of the stomach, in which the effect of the blister must be al-

most instantly produced. Its operation is accompanied with great pain, and a very pungent sense of heat: and it is apt to produce very unpleasant ulceration if allowed to remain too long applied.

EMPLASTRUM OPII. Lond. Edin. *Plaster of Opium.*¹

"Take of hard opium powdered, *half an ounce*; resin of the spruce-fir powdered, *three ounces*; lead plaster, *a pound*. Melt the plaster and the resin together, then add the opium, and mix the whole."

This plaster is anodyne, and supposed to be useful in relieving rheumatism and local pains: but although it is undoubtedly certain that opium, in that state of minute division in which it exists in the tincture, produces its specific effect on the system in a small degree, when externally applied; yet we doubt whether the anodyne properties of this plaster are such as to sanction its adoption into the London Pharmacopœia.

EMPLASTRUM OXIDI FERRI RUBRI. Edin. *Plaster of red Oxide of Iron.*

"Take of plaster of semivitreous oxide of lead, *twenty-four parts*; white resin, *six parts*; yellow wax, olive oil, of each *three parts*; red oxide of iron, *eight parts*. Rub the red oxide of iron with the oil, and adding the other ingredients melted, mix the whole well together."

EMPLASTRUM THURIS. Dub. *Plaster of Frankincense.*

"Take of litharge plaster, *two pounds*; frankincense, *half a pound*; red oxide of iron, *three ounces*. To the plaster and frankincense melted together add the oxide, stirring them together so as to form a plaster."

These plasters are supposed to be tonic; and are used in muscular relaxations, and weaknesses of the joints after sprains: but they act chiefly in affording a mechanical support to the parts.

EMPLASTRUM PICIS COMPOSITUM. Lond. *Compound Pitch Plaster.*

"Take of dried pitch, *two pounds*; frankincense, *a pound*; yellow resin, yellow wax, of each *four ounces*; expressed oil of nutmeg, *an ounce*. To the pitch, resin, and wax, melted together, add first the frankincense, then the oil of nutmeg, and mix the whole."

This plaster is stimulant and rubefacient. It is used in catarrh, and other pulmonary affections, applied to the thorax; and in head-ach and chronic ophthalmia, applied to the temples. When a serous exudation takes place, the plaster should be frequently renewed.

¹ Opiumplaster (G.)

EMPLASTRUM PLUMBI. Lond. *Lead Plaster.*^{*}

"Take of semivitreous oxide of lead, rubbed to a very fine powder, *five pounds*; olive oil, *a gallon*; water, *two pints*. Boil them together over a slow fire, stirring constantly until the oil and oxide of lead cohere into the consistence of a plaster. It will be necessary, however, to add a little boiling water, if that which was employed in the beginning shall be consumed before the end of the process."

EMPLASTRUM OXIDI PLUMBI SEMI-VITREI. Edin. *Plaster of Semivitreous Oxide of Lead.*

"Take of the semivitreous oxide of lead, *one part*; olive oil, *two parts*; water, *a sufficient quantity*. Boil them, stirring constantly, until the oil and the oxide unite into a plaster."

EMPLASTRUM LITHARGYRI. Dub. *Litharge Plaster.*

"Take of litharge in fine powder, *five pounds*; olive oil, *nine pounds*; boiling water, *two pints*. Mix them at a high temperature, constantly stirring, until the oil and the litharge unite so as to form a plaster; supplying occasionally any waste of water that may take place."

The use of the water in the formation of these plasters is to moderate the heat of the mixture, until the oil and the oxide combine, by which means the reduction of the metal is prevented; a circumstance which is apt to take place from the strong attraction of the oil for oxygen when raised to a high temperature. By continuing the boiling the water is dissipated; and the temperature can then be increased to a sufficient degree to give the plaster the necessary consistency. The water which is added should be previously made hot; as cold water is apt to produce an explosion, which may prove dangerous to the operator. When long kept, these plasters change their colour, and lose most of their sensible properties.

These plasters are intended chiefly to defend excoriated surfaces from the action of the air; and to form the basis of some other plasters.

Official preparations. *Emplastrum Hydrargyri.* L. E. *Emplastrum Opii.* L. *Emplastrum Assafoetidae.* E. *Emplastrum gummosum.* E. *Emplastrum Galbani.* D. *Emplastrum Galbani compositum.* L. *Emplastrum Oxidi Ferri rubri.* E. *Emplastrum Resinae.* L. E. D. *Emplastrum Saponis.* L. E. D. *Emplastrum Thuris.* D.

EMPLASTRUM RESINÆ. Lond. *Resin Plaster.*²

"Take of yellow resin, *half a pound*; lead plaster, *three pounds*. Melt the lead plaster by a gentle heat, then add the resin in powder, and mix."

^{*} Emplatre de diachylon (F.) Bleipflaster (G.)

² Harzigtes Bleipflaster (G.)

EMPLASTRUM RESINOSUM. Edin. *Resinous Plaster.*

"Take of plaster of semivitreous oxide of lead, *five parts*; resin, *one part*. Melt them with a gentle heat; then continue stirring the mixture until it becomes stiff in cooling."

EMPLASTRUM LITHARGYRI CUM RESINA. Dub. *Litharge Plaster with Resin.*

"Take of litharge plaster, *three pounds and a half*; yellow resin, *half a pound*. Melt the litharge plaster by a moderate heat, then add the resin reduced to very fine powder, that it may melt quickly, and form a plaster."

These plasters are defensive, adhesive, and gently stimulant. They are used for retaining together the lips of recent wounds, when it is wished to heal them by the first intention; to give support to ulcerated parts; and to assist their granulation and cicatrization, according to the excellent method of Mr. Baynton. The plaster, however, originally used by Mr. Baynton contained less resin; 3vj. only being added to lb. j. of the litharge plaster; but this preparation answers the purpose equally well, except in very irritable habits. The best substance for spreading it on for the above purpose is calico; and it is of some importance to spread it equally and thin; to effect which the calico must be stretched, and the plaster melted and beginning to cool, must be poured on one end of it, and equally extended over the whole surface by means of a spatula, held horizontally, and one edge of the blade raised to an angle of 45 degrees: or it may be still more equally done by passing the calico, on which the fluid plaster has been poured, through a machine formed of a straight blade of steel, fixed by screws, at a proper distance from a polished plate of the same metal. It is sold ready spread.

EMPLASTRUM SAPONIS. Lond. Dub. *'Soap Plaster.*

"Take of hard soap sliced, *half a pound*; lead plaster, *three pounds*. Mix the soap with the melted plaster; then boil it down to a proper consistence."

EMPLASTRUM SAPONACEUM. Edin. *Soap Plaster.*

"Take of semivitreous oxide of lead, *four parts*; gum plaster, *two parts*; soap sliced, *one part*. Mix the soap with the plasters melted together; then boil them a little so as to form a plaster."

Dr. Powell properly observes, that the soap plaster of the London College "must be formed into rolls when it begins to thicken, for afterwards, although it be still somewhat soft, it loses its tenacity, and will break to pieces."²

¹ Seifenpflaster (G.)

² Powell's Translation of the London Pharmacopœia, 2d. edit. 324.

Soap plaster is discutient; and is applied to lymphatic tumors: but it is much less useful than the mercurial plaster.

CERATA.

CERATES.

THESE are unctuous compositions possessing a certain degree of firmness, intermediate between that of plasters and that of ointments. Their consistence depends on the wax they contain; and from it they derive their generic appellation. The most important circumstance to be attended to in their preparation is the freshness of the fat and the oils employed; and their preservation in this state.

CERATUM SIMPLEX. Lond. *Cerate*.¹

"Take of olive oil, *four fluid ounces*; yellow wax, *four ounces*. Add the oil to the melted wax, and mix."

This is a useful simple emollient dressing to excoriations and sores.

CERATUM CALAMINÆ. Lond. *Calamine Cerate*.

"Take of prepared calamine, yellow wax, of each *half a pound*; olive oil, *a pint*. Mix the oil with the melted wax; then remove the mixture from the fire, and as soon as it begins to thicken, add the calamine, stirring constantly until it be cold."

CERATUM CARBONATIS ZINCI IMPURI. Edin. *Cerate of Impure Carbonate of Zinc*.

"Take of simple cerate, *five parts*; prepared impure carbonate of zinc, *one part*. Mix."

UNGENTUM CALAMINARE. Dub. *Calamine Ointment*.

"Take of ointment of yellow wax, *five pounds*; prepared calamine, *a pound*. Make them into an ointment."

These preparations are very useful dressings to excoriations and ulcers; and as they are in some degree desiccative, they are also applied to burns after the inflammation is abated; and to the eye-lids in ophthalmia tarsi. They have been long known in practice under the name of *Turner's cerate*.

CRATUM CETACEI. Lond. *Spermaceti Cerate*.²

"Take of spermaceti, *half an ounce*; white wax, *two ounces*; olive oil, *four fluid ounces*. Melt the spermaceti and the wax together, then add the oil, and stir them until they be cold."

CERATUM SIMPLEX. Edin. *Simple Cerate*.

"Take of olive oil, *six parts*; white wax, *three parts*; sper-

¹ Cerat simple (F.) Cerotto semplice (I.)

² Cerat de blanc de balaine (F.) Cerotto di Spermaceti (I.)

maceti, *one part*. Melt the wax and spermaceti in the oil, with a gentle heat; then keep constantly stirring until the mixture stiffens in cooling.

These are soft cooling dressings.

Official preparations. *Ceratum Lyttæ*. L. *Ceratum Carbonatis Zinci impuri*. E.

CERATUM LYTTÆ. Lond. ¹ *Cerate of Blistering Flies*.

"Take of spermaceti cerate, *six drachms*; blistering flies reduced to a very fine powder, *a drachm*. Add the blistering flies to the cerate, softened by the fire, and mix them together."

This cerate is intended to promote a purulent discharge from a blistered surface; and in general it answers this intention without occasioning much irritation. In some habits, however, it occasions strangury, great pain of the part, swellings of the lymphatics, and so much general irritation as to produce cedematose swellings and erysipelas of the neighbouring parts.²

It may be proper to observe, that it is preferable to spread cerates or ointments, intended to keep open issues, on lint; and that the dressings should in all cases be renewed once in twenty-four hours.

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 fluid ounces of the oil; then add gradually the superacetate of lead separately rubbed down with the remaining oil, and stir with a wooden spatula, until they be thoroughly incorporated."

This is an excellent cooling cerate for burns, excoriations, and other inflamed sores.

CERATUM PLUMBI COMPOSITUM. Lond. *Compound Cerate of Lead*.³

"Take of solution of acetate of lead, *two fluid ounces and a half*; yellow wax, *four ounces*; olive oil, *nine fluid ounces*; camphor, *half a drachm*. Melt the wax and mix it with eight fluid ounces of the oil; then remove them from the fire, and as soon as they begin to thicken, add gradually the solution of acetate of lead, and stir assiduously with a wooden spatula till

¹ Cerat de Cantharides (F.) Cerotto di Cantarille (I.)

² In one case, which came under my observation, a blister on the scalp was dressed for four days with this cerate. On the fourth day the head swelled to an alarming size; and an cedematose erysipelas covered the scalp and face, and shut up the eyes; accompanied with a great degree of fever. On removing the acrid dressings, and employing emollient fomentations, with dressings of cetaceous ointment, these alarming symptoms soon subsided.

³ This name is extremely improper. It ought to have been *Ceratum Plumbi Acetatis*, the virtue of the composition depending altogether on the acetate of lead.

they be cold. Finally, mix with these the camphor dissolved in the remainder of the oil."

This composition is similar to what was recommended by Goulard, as a mode of applying lead in the form of ointment; and long known under the name of *Goulard's cerate*. It is applicable to the same cases as the former cerate.

CERATUM RESINÆ. Lond. *Resin cerate.*¹

"Take of yellow resin, yellow wax, of each a pound; oil of olive, a pint. Melt the resin and the wax together by a slow fire, then add the oil, and strain the cerate while it is hot through a linen cloth."

UNGUENTUM RESINOSUM. Edin. *Resinous Ointment.*

"Take of hog's lard, eight parts; resin, five parts; yellow wax, two parts. Melt the whole with a gentle heat, and stir the mixture until it stiffens in cooling.

UNGUENTUM RESINÆ ALBÆ. Dub. *Ointment of White Resin.*

"Take of yellow wax, a pound; white resin, two pounds; prepared hog's lard, four pounds. Make them into an ointment, which is to be strained, while it is hot, through a sieve."

These ointments are stimulant, digestive, and cleansing; and therefore form an excellent dressing for foul and indolent ulcers.

Official preparation. *Linimentum Terebinthinæ*. L.

CERATUM SABINÆ. Lond. *Cerate of Savine.*

"Take of the fresh leaves of savine bruised, a pound; yellow wax, half a pound; prepared lard, two pounds. Melt the lard and the wax together, and boil the savine leaves in the mixture; then strain through a linen cloth."

UNGUENTUM SABINÆ. Dub. *Savine Ointment.*

"Take fresh leaves of savine freed from the stalks and bruised, half a pound; prepared hog's lard, two pounds; yellow wax, half a pound. Boil the leaves with the lard until they become crisp; then strain with expression; lastly, add the wax, and melt them together."

The preparation of this ointment is exceedingly difficult, as the acrid principle of the savine, on which its efficacy depends, is much injured by long boiling, or too high a temperature. Might it not be better to express the acrid juice from the fresh leaves, and mix it with the ointment when it begins to thicken by cooling? If the fresh leaves cannot be procured, it may be prepared from the dry leaves reduced to a fine powder; but the acrimony of the savine is impaired by drying them. The ointment when good has a beautiful deep green colour, and the odour of the fresh bruised herb. It should be

¹ Cerat Resineux (F.) Harzzerat (G.) Cerotto Resinoso (I.)

kept in closely covered pots, as it soon loses its virtue by exposure to the air.

Savine ointment, which was first described by Mr. Crowther¹, is well calculated for keeping up a purulent discharge from a blistered surface; which it does as effectually, and with much less irritation than the ointment of blistering flies. A white coat is apt to form on the discharging surface, and must be removed occasionally so as to allow the cerate to be applied to the sore.

CERATUM SAPONIS. Lond. *Cerate of Soap.*

“Take of hard soap, *eight ounces*; yellow wax, *ten ounces*; semivitreous oxide of lead powdered, *a pound*; olive oil, *a pint*; vinegar, *a gallon*. Boil the vinegar on the oxide of lead over a slow fire, stirring diligently until they incorporate; then add the soap, and boil again in a similar manner, until the moisture be entirely evaporated; lastly, mix with the oil the wax previously melted.”

The efficacy of this cerate evidently depends on the acetate of lead which is formed in the first stage of the process, the soap answering scarcely any other purpose than to give consistence and adhesiveness. It is occasionally used as a cooling dressing:

UNGUENTA.

OINTMENTS.

THESE are unctuous substances of nearly the same nature as cerates, but having a consistence much less firm, scarcely exceeding that of butter.

UNGUENTUM ACIDI NITROSI. Edin. *Ointment of Nitrous Acid.*

“Take of hog’s lard, *one pound*; nitrous acid, *six drachms*. Mix the acid gradually with the melted lard, and beat the mixture assiduously as it cools.”

Dublin.

“Take of olive oil, *a pound*; prepared hog’s lard, *four ounces*; nitrous acid, *an ounce by weight*. Melt the oil in a glass vessel, and add the acid to it; let them be exposed to a medium 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 become firm.”

In this process the acid is partially decomposed, nitrous gas is evolved, and the ointment is oxidized, assuming a yellow colour and a firm consistence. It was invented by Alyon, who

¹ *Observations on White Swelling.*

found it useful in syphilitic and herpetic ulcers; and it has been occasionally used in this country for the same purposes; but it is less useful than the ointment of nitrate of mercury.

UNGUENTUM CERÆ FLAVÆ. Dub. *Ointment of Yellow Wax.*

"Take of purified yellow wax, *a pound*; prepared hog's lard, *four pounds*. Form them into an ointment."

UNGUENTUM CERÆ ALBÆ. Dub. *Ointment of White Wax.*

"This is to be prepared in the same manner as the former, with the substitution of white for yellow wax."

These are useful dressings to benign ulcers and excoriations, and form the basis of the majority of the compound ointments of the Dublin Pharmacopœia.

UNGUENTUM CETACEI. Lond. *Spermaceti Ointment.*¹

"Take of spermaceti, *six drachms*; white wax, *two drachms*; olive oil, *three fluid ounces*. 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, *a pound*; prepared lard, *three pounds*. Make them into an ointment."

These ointments form the ordinary dressings for healing blistered surfaces and excoriations.

UNGUENTUM ELEMI COMPOSITUM. Lond. *Compound Ointment of Elemi.*²

"Take of elemi, *a pound*; common turpentine, *ten ounces*; prepared suet, *two pounds*; olive oil, *two fluid ounces*. Melt the elemi with the suet; then remove it from the fire, and mix in immediately the turpentine and the oil; lastly, strain the mixture through a linen cloth."

UNGUENTUM ELEMI. Dub. *Ointment of Elemi.*

"Take of elemi resin, *a pound*; white wax, *half a pound*; prepared hog's lard, *four pounds*. Form them into an ointment, which is to be strained through a sieve while it is hot."

These ointments are stimulant and digestive. They are used to keep open issues and setons; and as a dressing to ulcers which do not admit of the application of the adhesive straps.

UNGUENTUM HYDRARGYRI FORTIUS. Lond. *Strong Mercurial Ointment.*³

¹ Unguentum Spermaceti, P. L. 1787.

² Unguentum e Gummi Elemi, P. L. 1745. Onguent d'Elemi et de Terebenthine (F.) Elemisalbe (G.) Unguento di Elemi e Trementina (I.)

³ Ung. ceruleum fortius, P. L. 1745. Onguent. Mercuriale (F.) Quecksilbersalbe (G.) Unguento Mercuriale (I.)

“Take of purified mercury, *two pounds*; prepared lard, *twenty-three ounces*; prepared suet, *an ounce*. First rub the mercury with the suet and a little of the lard, until the globules disappear; then add the remainder of the fat, and mix.”

Two drachms of this ointment contain one drachm of mercury.

UNGUENTUM HYDRARGYRI. Edin. *Mercurial Ointment.*

“Take of mercury, mutton suet, of each *one part*; hog’s lard, *three parts*. Rub the mercury diligently in a mortar with a little of the hog’s lard until the globules disappear; then add the remainder of the lard.”

One drachm of this ointment contains twelve grains of mercury.

“It may also be made with double or triple the quantity of mercury.”

Dublin.

“Take of purified mercury, prepared hog’s lard, *equal weights*. Rub them together in a marble or an iron mortar until the globules disappear.”

One drachm of this ointment contains thirty grains of mercury.

UNGUENTUM HYDRARGYRI MITIUS.* Lond. Dub. *Milder Mercurial Ointment.*

“Take of the stronger mercurial ointment, *a pound*; prepared lard, *two pounds*. Mix them.”

One drachm of this ointment contains ten grains of mercury; but prepared according to the Dublin Pharmacopœia, with two parts of lard to one of mercury, one drachm contains a scruple of mercury.

The preparation of the stronger mercurial ointments requires much labour, care, and patience. During the trituration the mercury is mechanically divided into minute globules, which are prevented from running together again by the viscosity of the suet; and during the trituration they are afterwards gradually oxidized by attracting the oxygen of the atmosphere; the lard, the extension and the constant renewal of the surface exposed, favouring very much this effect. The fact of the oxidization of the metal in this process is now generally admitted; and whatever tends to favour it, as, for instance, a slight degree of rancidity of the lard, or the oil of eggs, shortens the time, and lessens the labour required for the preparation of the ointment. It is not uncommon, however, to use other means, which are not admissible, to facilitate the process, such as the use of sulphur or turpentine. The first may be detected by

* Unguentum ceruleum mitius, P. L. 1745.

the very black colour of the ointment, which is produced by the sulphuret of mercury; and also by the sulphurous odour exhaled, when a paper covered with a little of it is held over the flame of a candle: and the turpentine is detected by its odour also, when the ointment containing it is treated in the same manner. When newly prepared, mercurial ointment has a light gray or blueish colour, owing to its containing some unoxidized metal, which separates in globules when it is liquefied by a gentle heat: when kept for some time the colour is much deepened, and less metallic mercury subsides, owing to the more complete oxidizement of the metal. It is probable, therefore, that long kept mercurial ointment contains, besides the oxide, a sebate of mercury.

Medical properties and uses.—The strong mercurial ointment rubbed upon the skin is the ordinary mode of introducing a large quantity of oxide of mercury into the system. About ʒj. is rubbed upon the inside of the thighs, or any other part of the body where the cuticle is thin, every night and morning until the system is affected. The oxide contained in the ointment is absorbed during the friction, and carried into the habit; where it produces the same effects as arise from taking the remedy by the mouth, without the unpleasant affection of the bowels that very commonly follows the introduction of preparations of mercury into the stomach. In order, however, to produce the full effect of the friction, it must be continued until every particle of the ointment disappears; and the operation should be performed by the patient himself. The stronger mercurial ointment is used in this form as an antisyphilitic, as a deobstruent in hepatic affections, and to excite the absorbents in hydrocephalus. The weaker ointment is used only as a topical dressing in venereal sores. During a course of mercurials the patients should be kept in a moderately warm and dry, but airy chamber; and his diet should be chiefly weak broths, milk, and gruel.

The following Table shows at one view the quantity of mercury contained in each of the different ointments ordered by the British Colleges.

One drachm	{	of the Lond.	{ stronger ointment contains of merc. 30 grs.
			{ weaker ointment _____ 10
	{	of the Edin.	{ common ointment _____ 12
			{ stronger ointment _____ 30
	{	of the Dub.	{ weaker ointment _____ 20

UNGUENTUM OXIDI HYDRARGYRI CINEREI.

Edin. *Ointment of gray Oxide of Mercury.*¹

¹ Graue Quecksilbersalbe (G.)

"Take of gray oxide of mercury, *one part*; hog's lard, *three parts*. Mix."

As the whole of the mercury in this ointment is oxidized, it might, *à priori*, be supposed that it would answer all the purposes of the mercurial ointment; but it cannot be so easily introduced by friction, the oxide remaining on the surface of the cuticle after the unctuous matter is absorbed. It has, however, been too seldom employed to enable a correct judgment to be formed of its efficacy.

UNGUENTUM HYDRARGYRI NITRATIS. Lond.
*Ointment of Nitrate of Mercury.*¹

"Take of purified mercury, *an ounce*; nitric acid, *eleven fluid drachms*; prepared lard, *six ounces*; olive oil, *four fluid ounces*. First dissolve the mercury in the acid; then mix the solution, while it is hot, with the lard and oil melted together."

UNGUENTUM NITRATIS HYDRARGYRI FORTIUS; vulgo, UNGUENTUM CITRINUM. Edin. *Stronger Ointment of Nitrate of Mercury.*

"Take of purified mercury, *one part*; nitrous acid, *two parts*; olive oil, *nine parts*; hog's lard, *three parts*. Dissolve the mercury in the acid; then beat up the solution strongly with the lard and oil previously melted together, and nearly cold, in a glass mortar, so as to form an ointment."

UNGUENTUM SUPERNITRATIS HYDRARGYRI. Dub. *Ointment of Supernitrate of Mercury.*

"Take of purified mercury, *an ounce*; nitrous acid, *two ounces by weight*; olive oil, *one pint*; hog's lard, *four ounces*. Dissolve the mercury in the acid; then mix the solution with the oil and lard previously melted together, and form an ointment in the same manner as the ointment of nitrous acid."

UNGUENTUM NITRATIS HYDRARGYRI MITIUS. Edin. *Milder Ointment of Nitrate of Mercury.*

"It is made in the same manner as the stronger ointment, with a triple proportion of oil and lard."

In all of these formulæ too large a proportion of lard is used: for the excess of acid in the metallic solution oxidizing the fatty matters, occasions them to become too hard and brittle after the ointment has been kept for some time, when more than one-sixth of lard is employed. The addition of the metallic solution to the melted mixture of lard and oil should be gradual, and made in a broad flat vessel, so as to expose a large surface to the action of a current of air; while the stirring should be performed with a wooden spatula, and continued until the ointment be perfectly cold.

¹ Onguent citrin (F.) Gelbe Quecksilbersalbe (G.) Unguento Citrino (L.)

When prepared in the above manner, and with one-sixth part only of lard, this ointment has a beautiful golden colour, and is of the consistence of butter, which it retains if preserved in close pots; but when made with a larger proportion of lard, it become hard, brittle, and of a pale dirty yellow hue, marbled with green blotches.

Medical properties and uses.— This ointment is stimulant and detergent. When moderately diluted with lard it is a local remedy of great efficacy in herpetic eruptions, tinea capitis, and other cutaneous eruptions. The weaker ointment may almost be regarded as a specific in psorophthalmia, in the purulent ophthalmia of infants producing ectropium, and in ulcerations of the tarsi. It is applied by taking a little on the finger, liquefying it by the fire or the flame of a candle, and applying it along the inner part of the eyelids.

UNGUENTUM GALLÆ. Edin. *Ointment of Galls.*

“Take of galls, in fine powder, *one part*; lard, *eight parts*. Mix.”

This is a very useful application in pills, and has long been used, although it has never before obtained a place in the pharmacopœia.

UNGUENTUM HYDRARGYRI NITRICO OXYDI. Lond. *Ointment of Nitric Oxide of Mercury.*¹

“Take of nitric oxide of mercury, *an ounce*; white wax, *two ounces*; prepared lard, *six ounces*. Melt together the wax and lard, then add to the mixture the nitric oxide of mercury in very fine powder, and mix.”

UNGUENTUM OXIDI HYDRARGYRI RUBRI. Edin. *Ointment of red Oxide of Mercury.*

“Take of red oxide of mercury by nitric acid in fine powder, *one part*; hog’s lard, *eight parts*. Mix.”

UNGUENTUM SUBNITRATIS HYDRARGYRI. Dub. *Ointment of Subnitrate of Mercury.*

“Take of ointment of white wax, *half a pound*; subnitrate of mercury, *half an ounce*. Form them into an ointment.”

These are excellent stimulant ointments, well adapted for giving energy to indolent foul ulcers. They are also of great use in inflammation of the conjunctiva, with a thickening of the inner membrane of the palpebræ; and to specks of the cornea. They are to be applied in the same manner as the ointment of nitrate of mercury.

UNGUENTUM HYDRARGYRI PRÆCIPITATI ALBI.² Lond. *Ointment of White Precipitate of Mercury.*

¹ Rothe Quecksilbersalbe (G.)

² Unguentum e Mercurio præcipitato albo, P. L. 1745. Ung. Calcis Hydrargyri albi, P. L. 1787.

"Take of white precipitate of mercury, *a drachm*; prepared lard, *an ounce and a half*. Add the precipitated mercury to the lard previously melted by a gentle heat, and mix."

UNGUENTUM SUBMURIATIS HYDRARGYRI AMMONIATI. Dub. *Ointment of Ammoniated Submuriate of Mercury.*

"Take of ointment of white wax, *a pound*; ammoniated submuriate of mercury, *an ounce and a half*. Form them into an ointment."

These ointments are stimulant and detergent. They are recommended by Werlhoff, and some other German authors, as a remedy for itch, which may be safely used on infants; but they have been little employed in this country.

UNGUENTUM LYT'TÆ.¹ Lond. *Blistering Ointment.*

"Take of blistering flies finely powdered, *two ounces*; distilled water, *eight fluid ounces*; resin cerate, *eight ounces*. Boil the water with the blistering flies to half its quantity, and strain. Mix the cerate into the strained liquor, and evaporate it to a proper consistence.

UNGUENTUM INFUSI CANTHARIDIS VESICATORIÆ. Edin. *Ointment of Infusion of Blistering Flies.*

"Take of blistering flies, resin, yellow wax, of each, *one part*; Venice turpentine, hog's lard, of each, *two parts*; boiling water, *four parts*. Macerate the flies in the water for a night, and strain the liquor, expressing it strongly; add the liquor to the fat, and boil until the water be evaporated; then add the wax and the resin, and when these are melted, remove the mixture from the fire; add the Venice turpentine, and mix."

These ointments are sufficiently mild, but they do not always succeed in keeping open a blistered surface, the purpose for which they are designed. Little efficacy can be ascribed to the blistering flies, their acrimony being nearly destroyed by the heat employed for the evaporation of the water.²

UNGUENTUM JUNIPERI SABINÆ. Edin. *Ointment of Savine.*

"Take of fresh leaves of savine, *two parts*; yellow wax, *one part*; lard, *four parts*. Melt the wax and lard together, then boil in them the leaves, and express through a cloth."

This ointment is intended for keeping a blistered surface discharging, and answers the same purpose as the cerate of savine.

¹ Unguentum Cantharidis, P. L. 1787. Kantharidensalbe (G.)

² Galen employed an ointment made by macerating the entire insect in melted lard for twenty-four hours, and then straining by expression. Boerhaave proposed to boil the flies in water, then to pour off the liquid, and make an ointment of the boiled insects with the addition of lard.

UNGUENTUM CARBONATIS PLUMBI. Edin. *Ointment of Carbonate of Lead.*¹

"Take of simple ointment, *five parts*; Carbonate of lead, *one part*. Mix."

UNGUENTUM CERUSÆ sive SUBACETATIS PLUMBI. Dub. *Ointment of Cerussa, or Subacetate of Lead.*

"Take of ointment of white wax, *a pound*; cerussa reduced to a very fine powder, *two ounces*. Form them into an ointment."

These are useful, cooling, desiccative ointments, chiefly employed as dressings for burns.

UNGUENTUM OXIDI ZINCI IMPURI. Edin. *Ointment of impure Oxide of Zinc.*²

"Take of simple liniment, *five parts*; prepared impure oxide of zinc, *one part*. Mix."

UNGUENTUM TUTIÆ. Dub. *Ointment of Tutty.*

"Take of ointment of white wax, *ten ounces*; prepared tutty, *two ounces*. Form them into an ointment."

These ointments were formerly much used in ophthalmia tarsi; but they are now seldom employed.

UNGUENTUM PICIS LIQUIDÆ. Lond. *Tar Ointment.*

"Take of tar, prepared suet, of each *a pound*. Melt them together, and strain the mixture through a linen cloth."

UNGUENTUM PICIS LIQUIDÆ. Edin. *Tar Ointment.*

"Take of tar, *five parts*; yellow wax, *two parts*. Melt the wax with a gentle heat: then add the tar, and stir until the mixture stiffens in cooling."

UNGUENTUM PICIS LIQUIDÆ. Dub. *Tar Ointment.*

"Take of tar, mutton suet, of each *half a pound*. Melt them together, and strain them through a sieve."

Although the pitch and the tar ointments differ in their sensible qualities, yet they are both applicable to the same purposes. They are used with advantage as detergents in scabby foul eruptions, and tinea capitis.

UNGUENTUM PIPERIS NIGRI. Dub. *Ointment of Black Pepper.*

"Take of prepared hog's lard, *a pound*; black pepper in powder, *four ounces*. Form them into an ointment."

We are ignorant of the purpose for which this irritating ointment is designed.

UNGUENTUM PULVERIS CANTHARIDIS VESICATORIÆ. Edin. *Ointment of the Powder of Blistering Flies.*

¹ Onguent de Tuthie (F.) Unguento di Tuzia (I.)

² Onguent blanc (F.) Bleiweissalbe (G.) Unguento bianco (I.)

³ Unguentum e Pice, P.L. 1743. Unguentum Picis, P.L. 1787.

• “Take of resinous ointment, *seven parts*; powdered blistering flies, *one part*.” Sprinkle the powder into the melted ointment: and stir the mixture until it stiffens in cooling.

UNGUENTUM CANTHARIDIS. Dub. *Ointment of Blistering Flies.*

“Take of ointment of yellow wax, *half a pound*; blistering flies in powder, *one ounce*. Form them into an ointment.”

These ointments are intended for promoting a purulent discharge from blistered surfaces, and produce this effect sufficiently well when the irritation they excite can be supported, which, however cannot always be done. The flies should be reduced to a very fine powder, and very intimately mixed with the ointment.

UNGUENTUM RESINÆ NIGRÆ.¹ Lond. *Black Resin Ointment.*

“Take of black resin, yellow wax, yellow resin, of each *nine ounces*; olive oil, *a pint*. Melt them together, and strain through a linen cloth.”

UNGUENTUM SAMBUCI.² Lond. *Elder Ointment.*

“Take of elder flowers, prepared lard, of each *two pounds*. Boil the elder flowers in the lard, until they become crisp, then strain the ointment through a linen cloth.”

Dublin.

“Take of fresh elder flowers, *three pounds*; prepared hog's lard, *four pounds*; mutton suet, *two pounds*. Make an ointment of these in the manner directed for the preparation of the savine ointment.”

These ointments are simply emollient, and possess no advantages over simple ointment. They are vestiges of the redundant practice of former times.

UNGUENTUM SIMPLEX, Edin. *Simple Ointment.*

“Take of olive oil, *five parts*; white wax, *two parts*. Melt the wax in the oil; then stir the mixture until it stiffens in cooling.”

An useful emollient ointment for softening the skin.

Officinal preparations. Unguentum Oxidi Plumbi albi. E. Unguentum Acetatis Plumbi. E.

UNGUENTUM SUB-ACETATIS CUPRI. Edin. *Ointment of Subacetate of Copper.*³

“Take of resinous ointment, *fifteen parts*; subacetate of copper, *one part*. Sprinkle the subacetate into the melted ointment and stir until the mixture stiffens in cooling.”

UNGUENTUM ÆRUGINIS. Dub. *Ointment of Verdegris.*

¹ Unguentum basilicum nigrum, vel tetra pharmacum, P. L. 1745.

² Unguentum sambucinum, P. L. 1720.

³ Unguento Egiziaco (I.)

"Take of ointment of white wax, *a pound*; prepared verdgris, *half an ounce*. Make them into an ointment."

These ointments are escharotic and detergent. They are used as an occasional dressing to foul, flabby ulcers; and as an application to scrophulous ulcerations of the tarsi. They can scarcely be used in the undiluted state, unless to act as a caustic for taking down fungous flesh.

UNGUENTUM SULPHURIS. Lond. *Sulphur Ointment.*¹

"Take of sublimed sulphur, *three ounces*; prepared lard, *half a pound*. Mix them."

Edinburgh.

"Take of hog's lard, *four parts*; sublimed sulphur, *one part*. Mix."

Dublin.

"Take of prepared hog's lard, *four pounds*; sublimed sulphur, *a pound*. Form them into an ointment."

These ointments are specific in itch. They should be rubbed on the body every night until the disease be cured, but not more than one-fourth part of the body should be covered with it at a time.

UNGUENTUM SULPHURIS COMPOSITUM. Lond. *Compound Ointment of Sulphur.*²

"Take of sublimed sulphur, *half a pound*; white hellebore root in powder, *two ounces*; nitrate of potash, *a drachm*; soft soap, *half a pound*; prepared lard, *a pound and a half*. Mix them."

This ointment is employed in the same cases as the simple ointment. It is supposed to derive more efficacy from the addition of the white hellebore, but it often excites too much irritation.

UNGUENTUM VERATRI. Lond. *Ointment of White Hellebore.*³

"Take of white hellebore root powdered, *two ounces*; prepared lard, *eight ounces*; oil of lemon, *twenty minims*. Mix them."

UNGUENTUM HELLEBORI ALBI. Dub. *Ointment of White Hellebore.*

¹ Onguent soufré (F.) Schwefelsalbe (G.) Unguento Solforato (I.) As the smell of the sulphur ointments is objected to by many people, the following combination has been recommended.

"Take of subcarbonate of potash, *half an ounce*; rose water, *one ounce*; red sulphuret of mercury, *one drachm*; essential oil of bergamot, *half a fluid drachm*; sublimed sulphur, hog's lard, of each, *eleven ounces*. Mix them."

Bateman on Cutaneous Diseases, p. 200. note.

² Onguent soufré composée (F.) Unguento solforato composto (I.)

³ Unguentum Hellebori albi, P. L. 1787.

"Take of prepared lard, *a pound*; white hellebore root in powder, *three ounces*. Make them into an ointment."

These ointments are sometimes used for the cure of scabies, when the smell of the sulphur ointment is objected to; but they are less certain remedies.

UNGUENTUM ZINCI. Lond. UNGUENTUM OXIDI ZINCI. Edin. *Zinc Ointment.*¹

"Take of oxide of zinc, *an ounce*; prepared lard, *six ounces*. Mix them."

UNGUENTUM OXIDI ZINCI. Edin. *Ointment of Oxide of Zinc.*

"Take of simple liniment, *six parts*; oxide of zinc, *one part*. Mix."

Dublin.

"Take of ointment of white wax, *a pound*; oxide of zinc, *an ounce and a half*. Make them into an ointment."

These ointments are moderately astringent and stimulant. They are generally applied in chronic inflammation of the eye, depending on a relaxed state of the vessels: we find them also of very considerable use in sore nipples; and for removing ring-worm, particularly when it attacks the scalp.

LINIMENTA.

LINIMENTS.

THESE are compositions which have the consistence of oil or balsam; so as to allow them to be easily rubbed upon the skin. They are in general more active remedies than cerates or ointments; and act as local stimulants, relieving deep-seated inflammations and pains.

LINIMENTUM ÆRUGINIS. Lond. *Liniment of Verdegriis.*

"Take of verdegriis powdered, *an ounce*; vinegar, *seven fluid ounces*; clarified honey, *fourteen ounces*. Dissolve the verdegriis in the vinegar, and strain it through a linen cloth; then having added the honey, boil down the mixture to a proper consistence."

OXYMEL ÆRUGINIS. Dub. *Oxymel of Verdegriis.*

"Take of prepared verdegriis, *one ounce*; wine vinegar, *seven fluid ounces*; clarified honey, *fourteen ounces*. Dissolve the verdegriis in the vinegar, and strain it through a linen cloth; add the honey, and boil the mixture to a proper thickness."

¹ Onguent de Zinc (F.) Zinksalbe (G.) Unguento di Zinco (I.)

This preparation, which is improperly named a liniment by the London College, is detergent and escharotic. In the above state it is used for taking down fungous flesh; and considerably diluted is an useful stimulant to foul ulcers, which it clears and excites to a more healthy action. It has been employed as a gargle in venereal ulcerations of the mouth and fauces; but we cannot recommend it.

LINIMENTUM AMMONIÆ FORTIUS. Lond.

*Stronger Liniment of Ammonia.*¹

"Take of solution of ammonia, *a fluid ounce*; olive oil, *two fluid ounces*. Shake them together until they unite."

OLEUM AMMONIATUM. Edin. *Ammoniated Oil.*

"Take of olive oil, *eight parts*; water of ammonia, *one part*. Mix them."

LINIMENTUM AMMONIÆ. Dub. *Liniment of Ammonia.*

"Take of caustic water of ammonia, *two fluid drachms*; olive oil, *two fluid ounces*. Mix them."

In these preparations a chemical union takes place between the alkali and the fixed oil, and produces a white soap, which is kept fluid by the water of the solution of ammonia. It is an excellent rubefacient, and is efficaciously employed in cynanche tonsillaris, spread on a piece of flannel, and applied round the throat; and to relieve rheumatic pains, rubbed upon the skin over the affected part, often with the addition of a little camphor. We have found a medium proportion of solution of ammonia, or half a fluid ounce to two fluid ounces of oil, form a preparation better fitted for general use than the above.

LINIMENTUM AMMONIÆ SUBCARBONATIS. Lond. *Liniment of Carbonate of Ammonia.*²

"Take of solution of sub-carbonate of ammonia, *a fluid ounce*; olive oil, *three fluid ounces*. Shake them together until they unite."

This preparation is also a fluid soap, but the combination of the oil and alkali is prevented from being so perfect by the carbonic acid of the subcarbonate. It is also much less soluble in water, and after a little time, the soapy matter separates from the water. It is intended for the same purposes as the strong liniment, which can be readily rendered as mild by the addition of oil; and therefore this may be regarded as a superfluous preparation.

LINIMENTUM AQUÆ CALCIS; sive, **OLEUM LINI CUM CALCE.** Edin. *Liniment of Lime-Water.*

"Take of linseed oil, lime-water, of each *equal parts*. Mix them."

¹ Liniment volatil (F.) Ammonium liniment (G.) Linamento volatile (I.)

² Linimentum volatile, P. L. 1745. Linimentum Ammonise, P. L. 1787.

LINIMENTUM CALCIS. Dub. *Liniment of Lime.*

"Take of lime-water, olive oil, of each *three fluid ounces*. Mix them."

These are solutions of earthy soaps, formed by the chemical union of the lime and the oil. They are thick, of a white colour, and devoid of acrimony, and are very advantageously applied to burns and scalds. The soapy matter separates from the water, when it is kept for a little time, and therefore it is always better to prepare it only when it is wanted.

LINIMENTUM CAMPHORÆ. Lond. *Liniment of Camphor.*

"Take of camphor, *half an ounce*; olive oil, *two fluid ounces*. Dissolve the camphor in the oil."

OLEUM CAMPHORATUM. Edin. *Camphorated Oil.*

"Take of olive oil, *four parts*; camphor, *one part*. Mix them so as to dissolve the camphor."

OLEUM CAMPHORATUM. Dub. *Camphorated Oil.*

"Take of camphor, *half an ounce*; olive oil, *two fluid ounces*. Rub them together."

These solutions of camphor in fixed oil are very useful embrocations to glandular swellings, sprains, bruises, and to joints affected with rheumatic pains. Mr. Ware recommends them with the addition of half an ounce of the solution of subcarbonate of potash, to be applied to the eye-lids night and morning in incipient amaurosis.

LINIMENTUM CAMPHORÆ COMPOSITUM. Lond. *Compound Liniment of Camphor.*

"Take of camphor, *two ounces*; solution of ammonia, *six fluid ounces*; spirit of lavender, *a pint*. Mix the solution of ammonia with the spirit; then from a glass retort, by a gentle heat, distil a pint. Lastly, dissolve the camphor in this distilled liquor."

This is a very useful stimulant application to sprains, bruises, and rheumatic pains. It is also an excellent vehicle for introducing opium into the habit by means of friction. An embrocation composed of f ʒjss. of this liniment, and f ʒss. of tincture of opium, warmed and rubbed over the surface of the abdomen, very quickly allays the pains of flatulent colic.

LINIMENTUM HYDRARGYRI. Lond. *Liniment of Mercury.*

"Take of the stronger mercurial ointment, prepared lard, of each, *four ounces*; camphor, *an ounce*; rectified spirit, *fifteen minims*; solution of ammonia, *four fluid ounces*. First rub the camphor with the spirit, then with the lard and mercurial ointment: lastly, drop in gradually the solution of ammonia, and mix the whole."

This liniment is stimulant and discutient. It is employed as an embrocation to parts affected with chronic venereal pains, nodes, and topi; to indolent swellings, and to discuss morbid collections of fluid. One drachm should be rubbed on the affected part night and morning. When largely used, it salivates sooner than mercurial ointment.

LINIMENTUM SAPONIS COMPOSITUM. Lond.
*Compound Soap Liniment.*¹

"Take of hard soap, *three ounces*; camphor, *an ounce*; spirit of rosemary, *a pint*. Dissolve the camphor in the spirit, then add the soap, and macerate in the heat of a sand-bath, until they be dissolved."

TINCTURA SAPONIS CAMPHORATA; vulgo, **LINIMENTUM SAPONACEUM.** Edin. *Camphorated Tincture of Soap*; commonly called, *Liniment of Soap*.

"Take of hard soap sliced, *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 the camphor and the oil, frequently shaking the mixture."

These preparations are stimulant and anodyne, and may be advantageously applied against local pains, and in bruises rubbed upon the parts.

TINCTURA SAPONIS ET OPII; vulgo, **LINIMENTUM ANODYNUM.** Edin. *Tincture of Soap and Opium*; commonly called *Anodyne Liniment*.

"Take of hard soap sliced, *four ounces*; opium, *one ounce*; camphor, *two ounces*; oil of rosemary, *half an ounce*; alcohol, *two pounds*. Digest the soap in the alcohol for three days, then to the strained solution add the camphor and the oil, frequently shaking the mixture."

The addition of the opium to the soap liniment, renders it, in many cases of rheumatism and local pains, more useful than the simple liniment.

LINIMENTUM TEREBINTHINÆ. Lond. *Turpentine Liniment*.

"Take of cerate of resin, *a pound*; oil of turpentine, *half a pint*. Melt the cerate, then add to it the oil of turpentine, and mix them."

This liniment was introduced into practice by Dr. Kentish, at that time a surgeon in Newcastle, as a dressing to burns immediately after they happen, and until the loosening of the eschars. Dr. Kentish's plan was first to bathe the parts with warm oil of turpentine, and then to apply over them plasters, thickly spread, of this liniment; at the same time that he sup-

¹ Linimentum saponaceum, P. L. 1745. Kampferliniment (*G.*)

ported the strength with wine, opium, and cordials. After the life of the parts appeared to be restored, purges were given, the cordials omitted, and mild emollient dressings applied.¹ We have had several opportunities of witnessing the good effects of this plan of treatment.

CATAPLASMATA.

CATAPLASMS.

CATAPLASMS are in general extemporaneous preparations; but the two following formulæ are introduced into the Pharmacopœias to fix the proportions of the ingredients.

CATAPLASMA FERMENTI. Lond. *Yeast Cataplasm.*

“Take of flour, *a pound*; yeast of beer, *half a pint*. Mix, and expose the mixture to a gentle heat, until it begins to swell.”

The inflation is produced by the extrication of carbonic acid gas, on which the efficacy of the cataplasm depends; and which is evolved by the heat applied to the mixture exciting the fermentative process. In this state it is applied to painful, gangrenous, or foul ulcers; and soon corrects the fœtor of the discharge, while at the same time it hastens the sloughing of the sores.”

CATAPLASMA SINAPIS. Lond. *Cataplasm of Mustard.*

“Take of mustard seed, linseed, of each in powder *half a pound*; hot vinegar, *a sufficient quantity*. Mix them to the thickness of a cataplasm.”

CATAPLASMA SINAPEOS. Dub. *Mustard Cataplasm.*

“Take of mustard seed in powder, crumb of bread, of each *half a pound*; vinegar, *a sufficient quantity*. Mix them, so as to make a cataplasm. This preparation may be rendered more acrid by adding two ounces of horse-radish finely scraped.”

These cataplasms are powerful local stimulants, and rubefacients. They are to be spread on cloths to the thickness of about half an inch, and applied to the soles of the feet, in the low stage of typhus fever, particularly when stupor or delirium is present; and in apoplexy, coma, and other cases in which there is a great determination to the head. Their rubefacient effects are very quickly produced, and often so powerfully, as to raise blisters on the part.

¹ *Essays on Burns*, &c. by Edward Kentish, 1797 and 1800.

TABLE,

Showing the Proportion in which Opium and certain Preparations of Iron, Antimony, Arsenic, and Mercury are contained in some compound Medicines.

OPIUM.

CONFECTIO OPII. Lond. *Confection of Opium*. Thirty-six grains contain one grain of opium.

ELECTUARIUM OPIATUM. Edin. *Opiate Electuary*, in each drachm about one grain and a half of opium.

ELECTUARIUM CATECHU COMPOSITUM. Edin. *Electuary of Catechu*, contains in each ounce about two grains and a half of opium: or one hundred and ninety-three grains contain one grain of opium.

ELECTUARIUM CATECHU COMPOSITUM. Dub. *Compound Electuary of Catechu*, contains in each ounce about two grains and a half of purified opium.

PILULÆ SAPONIS CUM OPIO. Lond. *Pills of Soap and Opium*. Five grains contain one grain of opium.

PILULÆ OPIATÆ. Edin. *Opiate*, formerly *Thebaic*, Pills. Each drachm contains six grains of opium. A pill of five grains contains half a grain of opium.

PILULÆ STYRACE. Dub. *Storax Pills* contain, in five grains of the mass, one grain of purified opium.

PULVIS CORNU USTI CUM OPIO. Lond. *Powder of Burnt Hartshorn with Opium*. Ten grains contain one grain of opium.

PULVIS CRETÆ COMPOSITUS CUM OPIO. Lond. *Compound Powder of Chalk with Opium*. Two scruples contain one grain of opium.

PULVIS IPECACUANHÆ COMPOSITUS. Lond. Dub. *Compound Powder of Ipecacuanha*. Ten grains contain one grain of opium.

PULVIS IPECACUANHÆ ET OPII. Edin. *Powder of Ipecacuanha and Opium*. Each drachm contains six grains of opium, or one grain in ten grains of the powder.

PULVIS KINO COMPOSITUS. Lond. *Compound Powder of Kino*. Each scruple contains one grain of opium.

SYRUPUS OPII. Dub. *Syrup of Opium*, contains in one fluid ounce about one grain of the watery extract of opium: for the liquor is more than doubled in bulk by the addition of the sugar.

TINCTURA OPII. Lond. *Tincture of Opium*. Nineteen minims contain about one grain of opium.

TINCTURA OPII. Edin. *Tincture of Opium*, is made with two scruples of opium in each ounce of liquid, or each drachm should contain five grains. But one drachm of the tincture when evaporated yields only three grains and a half of opium.

TINCTURA OPII. Dub. *Tincture of Opium*, contains in one fluid drachm about four grains and a half of purified opium.

TINCTURA CAMPHORÆ COMPOSITA. Lond. *Compound Tincture of Camphor*. TINCTURA OPII CAMPHORATA. Edin. Half a fluid ounce contains nearly one grain of opium.

TINCTURA OPII AMMONIATA. Edin. *Ammoniated Tincture of Opium*, is made with about eight grains of opium in each ounce of liquid; or each drachm contains nearly one grain of opium.

TINCTURA OPII CAMPHORATA. Dub. *Camphorated Tincture of Opium*. Four fluid drachms and a half contain nearly one grain of purified opium.

TINCTURA SAPONIS ET OPII. Edin. *Tincture of Soap and Opium*, is made with one scruple of opium in each ounce of the liquid.

TROCHISCI GLYCYRRHIZÆ CUM OPIO. Edin. *Troches of Liquorice with Opium*. Each drachm contains nearly one grain of opium.

IRON.

TINCTURA ACETATIS FERRI CUM ALCOHOL. Dub. *Tincture of Acetate of Iron with Alcohol*. Each fluid drachm contains about one grain of dry acetate of iron.

ANTIMONY.

LIQUOR ANTIMONII TARTARIZATI. Lond. *Solution of Tartarized Antimony*, contains in each fluid ounce two grains of tartarized antimony.

VINUM TARTRITIS ANTIMONII. Edin. *Wine of Tartrate of Antimony*, contains in each ounce two grains of tartrate of antimony (formerly tartar emetic.)

MERCURY.

EMPLASTRUM HYDRARGYRI. Edin. *Mercurial Plaster*. Each drachm contains about sixteen grains of mercury, (fifteen grains, Lond.)

HYDRARGYRUS CUM MAGNESIA. Dub. *Mercury with Magnesia*. Three grains contain two of mercury.

HYDRARGYRUM CUM CRETA. Lond. *Mercury with Chalk*. Three grains contain one grain of mercury.

LIQUOR HYDRARGYRI OXYMURIATIS. Lond. *Solution of Oxymuriate of Mercury*. One fluid ounce contains half a grain of oxymuriate of mercury.

LINIMENTUM HYDRARGYRI. Lond. *Mercurial Liniment*. Six drachms contain one drachm of mercury.

PILULÆ HYDRARGYRI. Lond. Dub. *Mercurial Pills*. Three grains contain one grain of mercury.

PILULÆ HYDRARGYRI. Edin. *Mercurial Pills*. Each drachm contains fifteen grains of mercury. Each pill contains one grain of mercury.

PILULÆ HYDRARGYRI SUBMURIATIS COMPOSITÆ. Lond. Edin. *Pills of Submuriate of Mercury*. About four grains contain one grain of submuriate of mercury.

UNGUENTUM HYDRARGYRI FORTIUS. Lond. Dub. *Stronger Mercurial Ointment*. Two drachms contain one drachm of mercury.

UNGUENTUM HYDRARGYRI MITIUS. Lond. *Weaker Mercurial Ointment*. Six drachms contain one drachm of mercury.

UNGUENTUM HYDRARGYRI. Edin. *Mercurial Ointment*. Each drachm contains twelve grains of mercury; made with double the quantity of mercury, each drachm contains twenty grains.

UNGUENTUM NITRATIS HYDRARGYRI FORTIUS. Edin. *Stronger Ointment of Nitrate of Mercury*. Each drachm contains four grains of mercury.

UNGUENTUM NITRATIS HYDRARGYRI MITIUS. Edin. *Milder Ointment of Nitrate of Mercury*. Each scruple contains half a grain of mercury.

UNGUENTUM OXIDI HYDRARGYRI CINEREI. Edin. Each drachm contains fifteen grains of the oxide.

UNGUENTUM OXIDI HYDRARGYRI RUBRI. Edin. *Ointment of Red Oxide of Mercury*. Each drachm contains seven grains of the oxide.

ARSENIC.

LIQUOR ARSENICALIS, Lond. SOLUTIO ARSENICALIS. Edin. *Arsenical Solution*. One fluid ounce contains four grains of oxide of arsenic.