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COMPANION

TO THE

LONDON PHARMACOPŒIA,

THEORETICAL AND PRACTICAL.

By G. F. COLLIER, M.D.

MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON; TRANSLATOR
OF THEIR PHARMACOPŒIA IN 1824, AND FOR TWENTY YEARS ENGAGED
AS LECTURER, FIRST ON PHARMACEUTICAL CHEMISTRY AND
MATERIA MEDICA, AND AFTERWARDS ON THE THEORY
AND PRACTICE OF MEDICINE.

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LEICESTER SQUARE.

TO

ONE OF THE MOST DISTINGUISHED AND SUCCESSFUL PHYSICIANS

OF HIS AGE,

This Work is Dedicated

BY

THE AUTHOR,

WHO, SIXTEEN YEARS AGO, FORETOLD HIS FRIEND'S PROFESSIONAL EMINENCE,

AND NOW LIVES TO SEE HIS PROPHECY FULFILLED,

AND TO TESTIFY THAT, FOR ONCE AT LEAST,

FORTUNE HAS BEEN JUST;

SINCE TALENT, INDUSTRY, AND AN ENTHUSIASTIC

ATTACHMENT TO MEDICAL SCIENCE,

HAPPILY TEMPERED WITH DISCRETION,

HAVE, IN HIS CAREER,

MATURELY OBTAINED THEIR DUE REWARD.

PREFACE.

This Work is intended as a Supplement, or Key, or Expositor of the "London Pharmacopœia." In explaining the theories of the pharmaceutical processes, the Author has endeavoured

> "To catch the chemic fashions as they rise;"

taking, them, however, at their due value, and accounting them as useful exercitations for students in pharmacy, which may be as ephemeral as those older, and now obsolete, productions of human ingenuity, each and all of which have for a time been stored up as valuable additions to our stock of true knowledge. To communicate useful information ultimately bearing upon practice, although immediately appertaining to the laboratory, the dispensary, the counter, or the bed-side, has been made the chief consideration. The older names have been traced through the last century; but, in the next edition of the Pharmacopœia, it would be more convenient to give an alphabetical list, in order that the dispenser may at once refer to the medicine, and find its nearest synonym. With regard to the notice of Poisons, no person who reflects how frequently such cases are dealt with at chemists' shops, will doubt the propriety of subjoining a conspectus of them. Brief notices of certain Trade Chemicals, not set forth in the Pharmacopœia, seemed to be wanting to complete the volume, together with tables chemical and practical.

Some of those few friends whose opinions I prize, inform me that my late "Translation" has given mortal offence to the Members of the Royal College of Physicians. Having in part educated one-third of their members of the last fifteen years, I demand their respectful attention;

a demand which would be attended to even by schoolboys; and as my arguments and complaints in a former preface and pamphlet were so unpalatable, I shall now simply state facts, and leave the public further to reflect on their conduct and mine.

In the autumn of 1835, I applied at the College to know whether any member (fellow, or licentiate,) were about to bring out an English edition of the Pharmacopœia. I learned from their resident officer, Mr. Sedgwick, that the work was to be given to Mr. R. Phillips; to whose talents and merits as a pharmaceutical and manipulatory chemist, I candidly give my humble testimony. I also applied to Longman and Co., and learned the same from Mr. Green, a partner in that firm. Having brought out an edition of their Pharmacopœia in 1820, I felt there could be no impropriety in expounding publicly to the world a book which they had individually been too happy to get me privately to expound to themselves. The parties (the College) most interested in the College Translator, heard of my forthcoming book. They (the College) advertised in every considerable paper for a month, that they would treat any second translation as an illegal publication. They frightened my publishers (Simpkin and Co.), who had made an arrangement for the sale of the book, and who consequently required to be released, and were accordingly released, from that arrangement. Their threatening advertisements intimidated my printers, who, in consequence, demanded a guarantee; and they thus kept me out of the market until they had achieved their own unworthy object—that of securing a prior sale.

I published my book—I demanded that they should fulfil their threat, or apologise. They have done neither the one nor the other, nor have they delivered up the name or names of the offenders whom they affect to repudiate.

They have, through their friendly journalist, declared their ignorance of such advertisement. Who wrote the advertisement? A Censor? Who read the advertisement before it was transferred to the printers? A Censor?

One of the Censors, for whom I wish to entertain the highest respect, has declared he knew nothing of it: neither he, nor his President, nor his Colleagues, knew any thing of it! Yet they could not take up a paper or journal for a month after the publication of the College Pharmacopœia which did not daily contain the obnoxious threat!! *Credat Judæus!!*

Gentlemen Censors, and Fellows of the College! the book is not only published, but it is out of print. You have rewarded me, who have for twenty years been gradually raising the degraded character of your examinations, by holding up my book to the world as an illegal publication. Can any moral ingratitude be greater? One third of you are parricides in thought towards me, your mental parent.

Gentlemen, again I say resist, recant, or retreat, with what silent dignity you may!

Human resentment, too often, perhaps always alloyed, as in my case, with human selfishness, will vanish and be forgotten; but when the inchoate act of oppression or of chicanery which had given birth to such feelings becomes recorded in the annals of medical literature, although the individual perpetrators may ensconce themselves behind the screen of corporate irresponsibility, or be lulled into the lazy lethargy of rank luxuriance, yet the opprobrium of the act shall be fixed on the body corporate from whence it officially sprung; and those who could not sympathise, will know how to sneer and to reproach—each at his own convenience.

To such of my readers as may consider that, after the lapse of three years, it were better to let the matter sink into oblivion, I reply, that within a few hours of my writing this Preface, my printers have shirked the responsibility of introducing any publishers' names into the title-page without a direct sanction from each party; and the publishers themselves are too timid to give their direct sanction, until the College anathema shall have been removed as publicly and officially as it was imposed. One of them, who knows them not as well as I know them, observed that he could not bring himself to believe that an ancient and respectable corporate body would so far compromise its own dignity as to fulminate a threat which it had not the power of executing; nor so base as to skulk away in silence, and leave a brother-physician, one of their own body, in such an unprecedented position without reparation, without investigation, without any attempt at self-justification. Since, even if it had been done without their authority or cognizance (which I flatly deny), it was equally their duty, as honest men, to give to the world a public announcement to that effect, and to surrender the names of the mock Censors who so adroitly assumed their functions and authority. This they have not done; they have preferred juggling and jesuitism by indirect repudiation through that pattern for all modern Medical Journalists—that frank, high-couraged, straightforward, single-hearted gentleman, who some years ago, when all that was valuable and interesting in medical institutions was endangered by the pressure from without, was prudently selected to defend the breach by the same weapons with which Crusoe is represented to have repelled the Cochin Chinese, although not with equal success; and who has since been rewarded by a fellowship, because, like the Abyssinian boy, whose death is recorded by Mungo Park, "He never told a lie. Never! never!"

Thus stands the matter. I have accused, and do accuse, Henry Halford, John Ayrton Paris, William Frederick Chambers, Henry Holland, and Richard Bright, of having (officially) been the instigators of a tricksome advertisement, the aim and end of which was to deprive me of my share of public reward for the performance of a public task, which not a fellow of their College had the industry to perform. The ban of that advertisement is still on my work; they have never publicly or officially removed it. Three years ago I challenged investigation at their *comitia*, according to the by-law and immemorial practice of their Institution. They shrank from investigation; but employed certain reviewers to insinuate their innocence. I say they are guilty! Will they summon me, and let me have the opportunity of confronting them at a meeting of their fellows, with the privilege of calling for *one paper and two persons?*—They dare not!

SUPPLEMENT.

ACIDA.

Acids.

ACETUM DESTILLATUM.

Distilled Vinegar.

Acetum Destillatum, P. L. 1720, to P. L. 1788.
Acidum Aceticum, P. L. 1809.
Acidum Aceticum Dilutum, P. L. 1824.

Preparation.—By the heat employed the vinegar rises in vapour, and as it passes through the tube of the still it again becomes liquid as it cools, and is thus freed from any artificial impurity (sulphuric acid), and from a part of the natural impurities, which are always found in it, such as colouring matter, mucilage, &c.; but by the present process it will always contain a little alcohol.

Tests.—For the tests of impurities in this, and as regards all other preparations, *vide* "Notes" at the commencement of the Pharmacopœia, and in the Caution column of the body of the work.

Properties.—Distilled vinegar is colourless; of a flat empyreumatic odour and taste; not so refreshing as the common vinegar is found to be before distillation, owing, perhaps, to the partial decomposition of colouring matter and mucilage by the heat necessary for the process.

Officinal Preparations.—Acetum Colchici, Acetum Scillæ, Liquor Ammoniæ Acetatis.

Commentary.—It must be carefully remarked, that the present Pharmacopœia contains three preparations of acetic acid of different strengths:—

Acetum, various (commonly prepared by fermentation from malt).
Acetum Destillatum, 4·6 per cent.
Acidum Aceticum, 30·7 per cent.

We must endeavour to avoid error amid this confusion of nomenclature. In P. L. 1809, the present Acetum Destillatum was called Acidum Aceticum; therefore in compounding a prescription under that Pharmacopœia, the modern dispenser will, if he use the present Acidum Aceticum, insert seven times as much real acid as was intended by the prescriber; and if in a collyrium, he will destroy the eyes; if in an internal preparation, the mucous membrane of the patient. To shew the folly and danger of this confusion, we have only to refer to the oxymel of the present

Pharmacopœia. The dose, say the College (*qui facit per alium facit per se*), is up to ℥j. That will be equivalent to ℥iss of common vinegar. Who can doubt that such a dose, two or three times repeated, would destroy the life of a delicate invalid, and distress even the robust? It is the soldier's antidote in intoxication by ardent spirits. It would have been better to have adopted the terms "Acetum commune," "Acetum Destillatum," "Acidum Aceticum fortius." The oxymel contains 30 fluidounces of Acetic Acid to 120 ounces of honey, or one-fourth of the acid. ʒij of Acetic Acid of 30·7, will be equal to ℥iss of common vinegar; and if not properly diluted, it will be more mischievous than a pint of this last.

ACIDUM ACETICUM.

Acetic Acid.

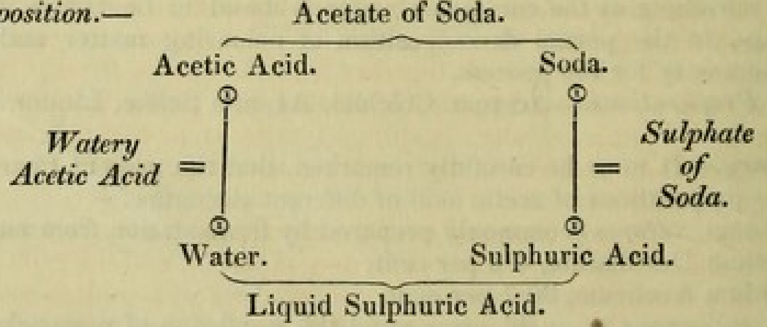
Acidum Acetosum, P. L. 1788.
Acidum Aceticum Fortius, P. L. 1824.

Composition.—	
Dry Acetic Acid	30·8
Water	69·2
	100

Commentary.—The Acidum Aceticum fortius, è ligno destillatum, as contained in the last Pharmacopœia, is rejected from the present; but as no process is given for the manufacture of the acetate of soda, we are to presume that the manufacturing chemist may use the pyroligneous acid for that purpose. It is prepared by heating and decomposing wood in iron cylinders, and combining the impure acid with soda. The acetate thus formed is purified by repeated solution and crystallization.

Acetic Acid	1	equivalent	= 51
Soda	1	——	= 32
Water	6	——	= 54
			137

Decomposition.—



The eye following the lines will catch the exchange. *Results,* Watery Acetic Acid, P. L. 30·7, and one equivalent of Sulphate of Soda dry.

College Preparations.—Acetum Cantharidis, Potassæ Acetas, Plumbi Acetas, Morphiæ Acetas, Oxymel.

Commentary.—When the reader has duly perused this process, he will not think it unimportant that I inform him, that if he make the acid by this process, or by any process, without first taking out a license, which will cost him 100*l.* he is liable to a heavy penalty. It will be convenient to bear in mind, that in the vinegar trade the term per centage, expressive of the strength of vinegar, is not used in the same sense in which we more correctly employ it. Beaufoy's vinegar for example, of 40 per cent above proof, only contains 25 per cent of real acid; or, as they would say, it contains 5 vinegars, reckoning 10 per cent for every additional 5 of real acid; and 10 for the first 5 per cent.

ACETUM CANTHARIDIS. (*EPISPASTICUM.*)

Vinegar of Cantharides. (*Epispasticum.*)

Composition.—The Cantharides contain an acrid principle, called Cantharadin; a fatty matter; a green oil, inert and soluble in alcohol; black and yellow matter; uric and acetic acids, and traces of the earthy phosphates. This vinegar should always be used tepid.

ACETUM COLCHICI.

Vinegar of Meadow Saffron.

Acetum Colchici, P. L. 1809, P. L. 1824.

Commentary.—For nearly twenty years we were told by those gentlemen who are denominated, *par excellence,* "Principes artis," that the virtue of this plant resides in a vegetable alkali, like to that contained in the white hellebore. It is now said to contain a distinct alkali, called by the harmonious name of Colchicia.

Process for obtaining Colchicia.—Digest meadow-saffron seed in boiling alcohol; detach the acid from the salt thus dissolved, using magnesia as your precipitant, and the colchicia will be deposited, together with the excess of magnesia. Re-dissolve the colchicia by a second portion of alcohol, and then crystallize.

Properties.—Crystals acicular; inodorous; taste at first bitter, and afterwards acrid. It differs from veratria in not exciting sneezing, and in being soluble in water. Highly poisonous.

Composition.—To save time and needless repetition, it may be assumed that all the vegetable alkalies consist of carbon, hydrogen, azote, and oxygen; for which I recommend as a mnemonic the word C H A O s, which will conduct the memory to these four elements, while the terminal *s* will remind the student that they are salifiable, and save endless repetition, as thus:—

C arbon,
H ydrogen,
A zote,
O xygen,
s alifiable.

ACETUM SCILLÆ.

Vinegar of Squill.

Acetum Scilliticum, P. L. 1720, P. L. 1745.

Active principle, Scillitine; most probably constituted of CHAOs.

Prep. of Scillitine.—Scillitine may be obtained by macerating squills in alcohol; evaporating the solution, after separating the alcohol by distillation; and again treating the residue with spirit and with æther.

Properties.—Its colour is bright yellow; it is flocculent, but softens in hot water, and forms into a mass, which, after the process of drying, acquires a brownish colour; its odour is urinous; its taste, acrid and bitter. It is highly destructive. This is the principle which renders the squill bulb so effective a counter-irritant, for which purpose it was a favourite rubefacient among the ancients, and was rubbed over the stomach to check vomiting.

ACIDUM BENZOICUM.

Benzoic Acid.

Flores Benzöini, P. L. 1720.
Flores Benzöes, P. L. 1788.
Acidum Benzoicum, P. L. 1809, P. L. 1824.

Composition.—14 equivalents of Carbon ....$6 \times 14 = 84$
5 ——— Hydrogen......$1 \times 5 = 5$
3 ——— Oxygen........$8 \times 3 = 24$
113
1 equivalent of water in the crystals............ 9
122

Or, according to former analyses,
15 equivalents of Carbon .... $6 \times 15 = 90$
6 ——— Hydrogen......$1 \times 6 = 6$
3 ——— Oxygen..........$8 \times 3 = 24$
120

Theory of Sublimation.—The acid is volatilized by the heat, and, rising into the upper and cooler part of the apparatus, is gradually condensed there.

Properties.—Colourless, when pure; crystals soft, somewhat flexible, and slightly odorous like benzoin; taste aromatic, and very slightly sour; not affected by exposure to air; soluble in 200 times its weight of cold, or in 24 of boiling water; and the solution on cooling yields a crystalline mass, having the appearance of fat; largely soluble in alcohol. The solution of this acid very slightly affects litmus; it melts and sublimes at a moderate heat, and burns with a bright yellow flame if the heat be considerably raised; not decomposed by liquid sulphuric, nor by nitric acid. Unites with the alkalies and metallic oxides, to form benzoates.

Commentary.—It is of no great consequence whether the white or brown benzoin be employed in the process, since they both contain nearly 20 per cent of benzoic acid. The impurities are resin and a trace of volatile oil. The oil, which is directed to be separated by expression, is conjectured to be formed by the decomposition, and renewed composition of the resin.

Character of the Benzoates.—Taste, usually saline and subacrid; decomposed by most other acids, with the separation of benzoic acid; soluble in the hot solutions of the acetate of potassa and soda, and of nitrate of soda; insoluble in solutions of nitre and sulphate of potassa and soda. The alkaline benzoates are decomposed by destructive distillation into carbonates, with the formation of various new products.—(*Vide* TURNER's "Chemistry," Part III., page 826.)

ACIDUM CITRICUM.

Citric Acid.

Acidum Citricum, P. L. 1809, P. L. 1824.

Composition.—2 equivalents of Hydrogen...... $1 \times 2 = 2$
4 ——— Carbon......... $6 \times 4 = 24$
4 ——— Oxygen......... $8 \times 4 = 32$
Equivalent... 58 Anhydrous.

Crystals of Commerce.—3 equivalents of dry Acid $58 \times 3 = 174$
4 ——— Water... $9 \times 4 = 36$
Equivalent...... 210

Decomposition.—The lime of the chalk unites with the citric acid, forming a citrate of lime, which is nearly insoluble, and therefore precipitated, and the carbonic acid is expelled. The precipitate is washed, and decomposed by boiling it with diluted sulphuric acid, which unites with the lime, and leaves the citric acid in solution.

Products.—Stage 1.—Citrate of Lime precipitated.
Carbonic Acid expelled.
Mucilage and Water remain.
Stage 2.—Sulphate of Lime precipitated.
Citric Acid in solution, afterwards crystallized.

Both are simple decompositions, and need no diagram.

A separates B from C, because A (Citric Acid) has a greater affinity for B (Lime) than for C (Carbonic Acid).

We shall use diagrams occasionally, but can see no necessity thus to illustrate facts so simple as single elective affinity. The most obtuse individual can surely understand that one substance having a certain affection for a second substance, may however desert and unite with a third substance for which it has a stronger affection, whenever such third substance is proffered under favourable circumstances for union.

Properties.—The crystals are colourless, inodorous, and intensely sour; soon becoming damp by exposure to a moist atmosphere; and their form is a right rhombic prism.

Commentary.—A solution of the above acid, like lemon juice, becomes mouldy by being kept. An ounce and a half to a pint of distilled water is equal in strength to the best fresh lemon juice, but certainly does not possess the fragrance and freshness of the vegetable juice.

ACIDUM HYDROCHLORICUM (*Liquidum*).

Hydrochloric Acid (*Liquid*).

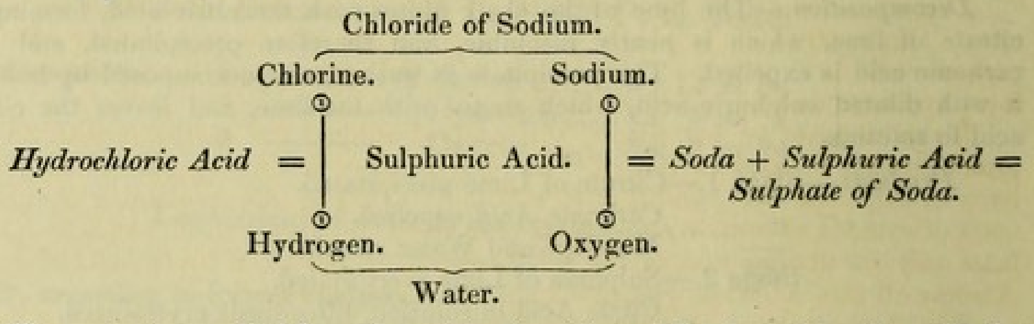
Spiritus Salis, P. L. 1720.
Spiritus Salis Marini Glauberi, P. L. 1745.
Acidum Muriaticum, P. L. 1788, 1809, 1824.

Composition.—Two-thirds water, one-third hydrochloric acid gas, which is itself composed of—

1 equivalent of Hydrogen	= 1	or	2·7
1 ——— Chlorine.	= 36		97·3
Equivalent...	37		100

Decomposition.—For the better understanding of other decompositions in which hydrochloric acid plays a conspicuous part, the student will do well to bear in mind that this acid is decomposed by metals, which are dissolved by it with the evolution of hydrogen gas; but if an oxidized metal be acted upon by it, in that case, the oxygen of such oxide unites with the hydrogen to form water, and the chlorine with the metal to form a chloride; while the proper salts of this acid are called hydrochlorates, or muriates. Chloride of sodium is composed of one equivalent of chlorine and one of sodium. This is put into a retort with liquid sulphuric acid and water. The water yields its hydrogen to the chlorine to form hydrochloric acid gas, which passes into the receiver; while its oxygen unites with the sodium to form an equivalent of soda, which neutralizes the sulphuric acid.

Products.—Hydrochloric acid gas dissolved in the water, sulphate of soda in the retort, generally with some excess of acid.



The water is supplied from the sulphuric acid, and the dry acid unites with the soda to form the residuary sulphate. If the student knows the atomic weights, nothing is easier than to ring the changes upon them, as for example: "60 parts of chloride of sodium are distilled with 49 parts of sulphuric acid, consisting of 40 parts of dry acid and 9 parts of water. The water is decomposed, its 1 of hydrogen uniting with 36 of chlorine to form 37 of hydrochloric acid, and the 8 of oxygen with the 24 of sodium to form 32 of soda, which are neutralised by the 40 of sulphuric acid, to form 72 of sulphate of soda. The reader will therefore remark, that if he know the atomic weights he can at all times insert these numbers at his own pleasure; and if he know them not, it will be his business to learn them. He will therefore only occasionally be supplied with such examples in the present work.—(*Vide* Atomic Weights at the end).

Properties.—Hydrochloric acid gas is colourless, invisible when not in contact with the air; of a pungent odour; sour acrid taste; irrespirable; uninflammable; and a non-supporter of combustion. It is elastic under ordinary circumstances, but liquid under the pressure of 40 atmospheres at the temperature of 50° recovering its gaseous condition when the pressure is removed. It is not affected by heat. When it escapes from the bottle it forms dense white fumes, owing to its great affinity for the water of the atmosphere. One cubic inch of water at 40° is capable of dissolving 480 cubic inches of this gas. If wanted in its gaseous state, it must be collected over mercury. Liquid hydrochloric acid, as above, should be limpid, and free from all tint; its specific gravity is 1·16.

Commentary.—One fluidounce of the above liquid, with three fluidounces of distilled water, constitute the "acidum hydrochloricum dilutum."

ACIDUM HYDROCYANICUM DILUTUM.

Diluted Hydrocyanic Acid.

(*Prussic Acid.*)

2 per Cent.

Composition.—Real Hydrocyanic Acid	grs.	2
Water		98
		100

The real acid, with a due regard to its elements, must be considered as a hydro-bicarburet of azote, and it is constituted of—

1 equivalent of Hydrogen	1	or	3·7
1 ——— Cyanogen	26		96·3
Equivalent	27		100

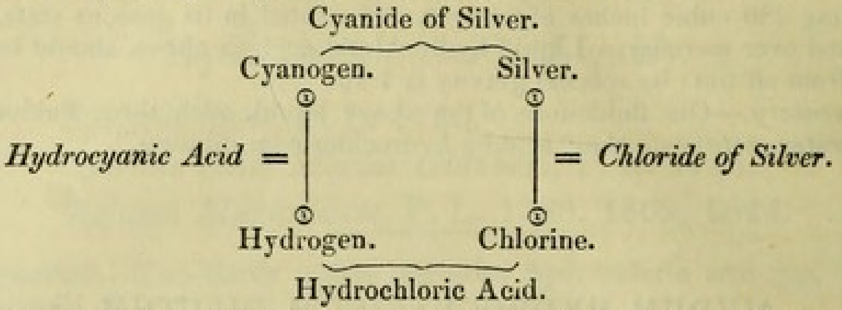
Decomposition.—This process is taken from Giese, who invented it ten years ago. The water of the sulphuric acid is decomposed; its oxygen uniting with the potassium to form potassa; its hydrogen with the cyanogen of the ferrocyanide to form hydrocyanic acid, which is distilled.

If this account be too simple, the medical student can clothe it with all the grandisonance of modern theory. He may assume that we operate on 6 equivalents of sulphuric acid, and 2 of ferrocyanide of potassium, containing 2 equivalents of cyanide of iron, 4 equivalents of cyanide of potassium, of which 3 equivalents only are decomposed, as also are 3 equivalents out of 12 equivalents of water. Assume all this, and then you can frame the following theory:—

The 3 equivalents of water are decomposed by the 3 equivalents of ferrocyanide of potassium, that is to say, 3 of oxygen with 3 of potassium form 3 of potassa, which unite with the 6 of sulphuric acid to form 3 of bisulphate of potassa; while the 3 of hydrogen with the 3 of cyanogen recently deserted by the potassium, constitute 3 equivalents of hydrocyanic acid. The ingenious reader will notice that 1 equivalent of cyanide of potassium and 2 equivalents of cyanide of iron are not yet accounted for. They are said to unite and form yellow salt. If the student duly intersperse the multiples of the atomic weights, he will not fail to pass for a complete chemist.

Products.—3 equivalents of Bisulphate of Potassa		384
3 ——— Hydrocyanic Acid		81
1 ——— Cyanide of Potassium	uniting to form yellow salt	174
2 ——— Cyanide of Iron		
9 ——— Water		81
	(Everett)	720

In the second or extemporaneous process for procuring this acid, it is directed to be obtained from cyanide of silver and hydrochloric acid. A double exchange of elements will yield hydrocyanic acid and chloride of silver.



Properties.—A limpid liquor, of a strong pungent odour, very like that of bitter almonds. Its taste is acrid, and it is well known to be highly poisonous. The sp. gr. of the real acid is ·6969. It volatilizes so readily as to freeze itself when a drop is placed upon paper. It mixes with alcohol and with water in all proportions. It is decomposed by many of the metallic oxides. It feebly affects litmus. It readily enters into spontaneous decomposition, and more rapidly if exposed to light, acquiring at first a brownish tint, and afterwards depositing a blackish sediment. The addition of a little dilute sulphuric acid, or hydrochloric acid to the medicinal acid, is reported to retard this change. When it loses its transparent appearance, and acquires a brownish tint, it is unfit for use. The diluted acid, as above prepared, containing only 2 per cent of real acid, participates in these properties in a lower degree.

Commentary.—It is impossible to avoid noticing the precarious, the uncertain, and therefore the dangerous character, of this remedy. After having been at the trouble to inquire into the manufacture of this highly poisonous substance, I find it is prepared by more than half a dozen different processes, and that but few houses can give any answer to your inquiries of its strength except, "Scheele's strength, sir;" and when asked what they mean by that, they cannot tell. The fact is, that Scheele's process has long been exploded as uncertain, and yielding an acid of variable strength. The strongest acid is the anhydrous, or Gay Lussac's, as it used to be called. This requires six times its bulk of distilled water to bring it down to the strength of Magendie's medicinal acid. Again, Magendie's acid thus diluted, containing one-seventh of real acid by volume, is not so strong as Roubiquet's, which is directed to be prepared by a mixture of water and the acid in equal parts. Vauquelin's process contains $\frac{1}{35}$ by weight of real acid. The prussic acid which used to be sold at Apothecaries' Hall contained $\frac{1}{16}$ of real acid, or more than 6 per cent; while that which we are now ordered to use only contains $\frac{1}{50}$, or 2 per cent. Surely, when we consider these widely differing degrees of concentration, we shall not be charged with offering remarks alien or impertinent, when we endeavour to impress on every prescribing practitioner, whether physician, surgeon, or apothecary, the utter absurdity of ordering the remedy, without a thorough understanding with the chemist who has prepared it, or with the dispenser whose duty it may be to compound from the prescription. With regard to the gradual deterioration of the remedy itself, however fixed and determinate the strength when it arrives from the manufacturer, it is quite unavoidable; and we are at a loss to propose any adequate means of prevention. Sulphuric or hydrochloric acids, in the quantity of a few minims to the ounce, have, as has been above suggested, been recommended for this purpose. The great volatility of the acid will, however, of itself, be sufficient to reduce its strength so as to baffle the intentions of the physician, and to render the fulfilment of his indications mere matter of contingency. The cyanide of potassium has been recommended as a substitute for the acid, since it is not liable to such variety, and is reported to possess the sedative effects of the acid in a lower degree. Its dose is $\frac{1}{8}$ of a grain, gradually increased; and it may be given in syrup, or in any simple water, or in barley-water. The manufacturing chemists of London profess to supply the acid of two degrees of strength, namely, that in obedience to the college mandate, at 2 per cent, and that which is foolishly called Scheele's strength, which is reported to be 6 per cent. The greater part used in Scotland, and prepared by the formula of Mr. Clarke, of Glasgow, contains nearly 3 per cent. I am told that 6 minims of hydrocyanic acid are occasionally taken as a favourite remedy for allaying gastric irritation after a debauch; and that some have taken a larger dose. If, however, the acid of 6 per cent be proffered under such circumstances, the danger will be considerable. The manufacturers do not act prudently in sending out the two articles in bottles of the same size and form, and, as regards the general appearance, with the same description and colour of label.

At some very respectable retail houses I have had shewn to me specimens labelled "*Hydrocyanic Acid—dose from one to three drops*," without further notice of the strength. Another label I have seen, which tells us that "this acid is twice the strength of that prepared by Vauquelin's process." Mr. Squire states the medium dose of his stronger acid as two minims, and that it is nearly three times as strong as the college acid. I cannot see the practical utility of stating the comparative strength of several preparations, instead of the absolute strength of each. I would recommend every label to be sent out thus:—

(Dilute) Hydrocyanic Acid, P. L. 1836.
2 per cent Real Acid,
98 Water.
100

or (if it must be sent out of different degrees of strength),

Hydrocyanic Acid (stronger),
4, 5, or 6 per cent Real Acid, as it may be, &c. &c.

And where the acid is sent in two or more different degrees of strength, the bottles, directions on the labels, and the colour of the labels, ought to be made as distinct as possible. It is generally stated, on the authority of the first chemists, that all hydrocyanic acid loses its transparency in a short time, and deposits a dark matter, the whole column of liquid at the same time assuming a deep brown tint. It has been asserted, both at the Royal Institution and by the late Dr. Turner, that the manufacturers of the article for consumption add a few drops of mineral acid (sulphuric or hydrochloric), to prevent this deposit. On analysis, it was found by Gay Lussac to contain carbon and nitrogen; and M. P. Boullay considers it to be a peculiar acid composed of carbon, hydrogen, and nitrogen; and for which he originated the name of azulmic acid. This statement, however, is denied by several good practical chemists, who have each and all assured me, that, if properly prepared, it will remain transparent, and suffer no decomposition whatever. Mr. Midgeley, of the Strand, has about three half pints of acid, of which he sent me a specimen, with the following memorandum:—

"This acid was prepared more than twelve years ago, from the triple prussiate of potash (ferrocyanide of potassium), decomposed by the bisulphate of potash. The exact proportions at this lapse of time are not remembered; but it is presumed that the quantity of the latter salt was regulated so as to supply, by computation, disengageable acid sufficient to decompose the former. The resulting acid has remained in a green glass bottle stopped; and although its strength is necessarily much impaired by the repeated removal of the stopper throughout the above period, yet it has never had any deposit, nor has it shewn the least diminution of limpidity; but is as transparent now as it was when it was put into the bottle twelve years ago." The quantity of water employed is not stated.

If allowed to interpose my own opinion, I should certainly presume that the decomposition is retarded by the dilution with water, and by the presence of a mineral acid. Dr. Christison examined a specimen which he had kept two years and a half, unchanged, though exposed to day-light, and he stated it to contain a small quantity of sulphuric acid. So again in Mr. Midgeley's specimen now before me (and his process seems to be a very good one), perfectly transparent, but very weak after having been in a certain degree exposed to light for twelve years, it may be fairly presumed that it is to the circumstance of its having been distilled from a bisulphate, that we are to look for the reason of its having so long preserved its transparency.

In my "Pharmacopœia," page 53, I affixed a caution-note on the difficulty of dissolving two ounces of the ferrocyanide in half a pint of water. I perceive that Giese directs it to be first finely powdered, which is omitted in the college formula.

In closing my remarks on this medicine, I cannot help regretting that many, nay a majority, of the physicians of this metropolis, are ordering the acid of "Scheele's strength," which I can tell them is not defined, instead of the collegiate strength, which *is* defined. That the remark may not be misunderstood, it may be as well to add, that no hydrocyanic acid lately met with in the London market contains 6 per cent, much of it not 4 per cent; and, however the system of single and double X may be interesting to brewers and publicans, the encouragement of such a practice in the sale of an article in the highest degree poisonous, by men who are supposed to be the guardians of public health, is inconvenient and unbecoming, and only to be accounted for by those who are aware how little attention is usually paid by them to these "trifling subjects." That they may learn how far they can rely upon the phrase "Scheele's strength," I beg to state to them, that at one chemist's shop an ingenuous dispenser told me he did not know exactly how strong the medicine was, but he had given two drachms to a cat without much effect; and I know it required one ounce of the acid so labelled to destroy a middling-sized dog. What indication in disease can by possibility require a stronger acid than that of 2 per cent? If any, my criticism falls to the ground.

ACIDUM NITRICUM.

Nitric Acid (Liquid).

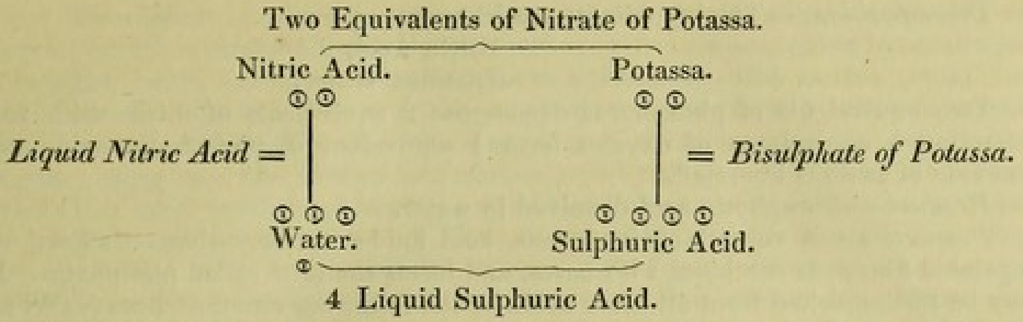
Aqua fortis, simplex et duplex, P. L. 1720.
Spiritus Nitri Glauberi, P. L. 1745.
Acidum Nitrosum, P. L. 1788.
Acidum Nitricum, P. L. 1809, P. L. 1824.

Composition.—Dry Nitric Acid, 2 equivalents...... $54 \times 2 = 108$
Water............ 3 ——— $9 \times 3 = 27$
135

Dry Nitric Acid consists of—
5 equivalents of Oxygen............ $8 \times 5 = 40$
1 ——— Azote............. $= 14$
54

Decomposition.—Ingredients are—
Nitrate of Potassa, dried, 2 equivalents
Sulphuric Acid............ 4 ———

The 2 equivalents of nitric acid unite with 3 equivalents of water to form 2 equivalents of liquid nitric acid, while the 4 equivalents of sulphuric acid with the remainder of the water unite with the 2 equivalents of potassa to form 2 equivalents of bisulphate of potassa.



The nitric acid abstracts three equivalents of water, the fourth being detained in the bisulphate.

The equivalent of water below that word unites with the sulphuric acid; the 3 above unite with the 2 equivalents of dry nitric acid to form liquid nitric acid. As, however, there is much difference of opinion as to the quantity of water which unites with the nitric acid, some saying 2 to 1, and others 3 to 2, I should recommend the student first to learn the theory in these simple terms following:—

"The sulphuric acid unites with the potassa, forming a bisulphate of potassa, which is left in the retort; the dry nitric acid, attracting the water, forms liquid nitric acid."

Mr. Brande has a diagram in his last "Manual of Chemistry," page 559, founded on the supposition that liquid nitric acid consists of 2 water and 1 dry acid.

Properties.—Liquid nitric acid is a transparent colourless fluid. It exhales white disagreeable fumes, and its taste is sour and corrosive. It always contains water. Its assigned specific gravity is 1·5; but this of course fluctuates with the quantity of water it contains. As found in the shops it has a yellowish tint, owing to the presence of an unimportant portion of nitrous acid; but even in this state it is sufficiently pure for pharmaceutical purposes. It has never been obtained in the dry state. The concentrated acid does not usually act on the metals; but, if water be added, the acid becomes partly decomposed, and deep red vapours (nitrous acid gas) appear; while the newly-formed oxide unites with the undecomposed acid to form a nitrate.

ACIDUM NITRICUM DILUTUM.

Diluted Nitric Acid.

Acidum Nitrosum dilutum, P. L. 1788.
Acidum Nitricum dilutum, P. L. 1809, P. L. 1824.

Relative Strength.—Ten fluidounces of the diluted acid contain one fluidounce of the undiluted. The sp. gr. is 1·080.

ACIDUM PHOSPHORICUM DILUTUM.

Diluted Phosphoric Acid.

Composition.—5 equivalents of Oxygen .... $8 \times 5 = 40$
2 ——— Phosphorus ...... $16 \times 2 = 32$
Equivalent...... 72

Diluted with water.

Decomposition. — The ingredients are Phosphorus,
Nitric Acid,
Distilled Water.

Two equivalents of phosphorus decompose 2 equivalents of nitric acid, and attracting 5 equivalents of oxygen form 1 equivalent of phosphoric acid, and binoxide of azote is liberated.

Product. — Phosphoric acid dissolved in water.

Properties.—A colourless, inodorous, acid fluid; not corrosive on animal or vegetable fibre. It combines with bases, and forms the salts called phosphates. It may be distinguished from all other acids by the following circumstances:—When carefully neutralized by pure carbonate of potassa or soda, it forms a solution in which no precipitate or change of colour is produced when a stream of hydrosulphurous acid gas is passed through it, but which is precipitated *white* by a solution of acetate of lead, and *yellow* by nitrate of silver: the first precipitate, the phosphate of lead, dissolves completely on the addition of nitric or phosphoric acid; the second, the phosphate of silver, is dissolved by both these acids, and by ammonia.

Commentary. — The phosphatic salts are used largely in some parts of the continent. Phosphate of soda was at one time a favourite remedy in this country, as a mild aperient, possessing a taste less unpleasant than other salines; and the phosphate of mercury is at present extensively employed in Germany.

ACIDUM SULPHURICUM DILUTUM.

Diluted Sulphuric Acid.

Spiritus Vitrioli tenuis, P. L. 1745.
Acidum Vitriolicum dilutum, 1788.
Acidum Sulphuricum dilutum, P. L. 1809, P. L. 1824.

Chemical Process, &c. — Sulphuric acid has a very intense affinity for water, and unites with it in every proportion. The combination takes place with a sudden developement of heat. When four parts by weight of concentrated sulphuric acid are mixed with one of water, the temperature, according to the experiments of Dr. Ure, rises to 300°. Sulphuric acid of commerce freezes at 15°. Diluted with water, so as to have a specific gravity of 1·78, it congeals even at above 32°. The composition of sulphuric acid is founded on the observation of Gay Lussac, that when the vapour of sulphuric acid is passed through a small porcelain tube heated to redness, it is resolved into two measures of sulphurous acid, and one of oxygen. We possess an unerring test of the presence of this acid; for, if a solution of chloride of barium is added to a liquid containing sulphuric acid, sulphate of baryta is formed, and precipitated white. Sulphuric acid is prepared by burning sulphur with $\frac{1}{8}$ its weight of nitrate of potassa in a furnace, so contrived that the current of air which feeds the combustion conducts the gaseous products into a capacious leaden chamber, on the bottom of which water has been poured, so as to rise to the depth of several inches. Several theories have in my time been given in explanation of this process; the following is the most approved: — During the combustion the sulphur is principally converted into sulphurous acid, and the nitric acid of the nitre being decomposed, gives off binoxide of azote, which in contact with the air necessarily becomes quatoxide or nitrous acid gas; so we have to consider that the mutual action of humidity, sulphurous acid and nitrous acid, forms a crystalline compound of sulphuric acid, hyponitrous acid, and water; that is to say, the sulphurous acid is converted into sulphuric by attracting 1 equivalent of oxygen from the nitrous acid, and therefore reducing that nitrous acid to hyponitrous; or, in other words, reducing the quatoxide to a teroxide. But as this crystalline compound solid falls into the water, the sulphuric acid is taken by the water, and nitrous acid and binoxide of azote escape with effervescence; the latter, the binoxide, being soon also formed into nitrous acid by the oxygen of the air. It is obvious that these portions of nitrous acid will again meet with successive portions of sulphurous acid; with which, and with the humidity, they will again form the same crystalline body, consisting of sulphuric acid, hyponitrous acid, and water; and so on, until the whole of the sulphur shall have been consumed. When the water of the chamber is sufficiently charged with acid, it is drawn off, and concentrated by evaporation. In the furnace, the potassa will be found to have combined with an equivalent of sulphuric acid, formed by the direct union of a portion of the sulphur with 3 equivalents of oxygen from the nitric acid. The student would do well to consider the changes under three heads:—

1. Changes in the furnace. Products. — Binoxide of azote, deflagrated sulphate of potassa.
2. Changes in the air. — Sulphurous acid, nitrous acid, reacting with watery vapour so as to form a crystalline compound, consisting of sulphuric acid, hyponitrous acid, and water.
3. Changes in the water.—This crystalline compound decomposed, the sulphuric acid combining with the water on the floor of the chamber, and the hyponitrous acid by a new arrangement of elements, giving off binoxide of azote, and nitrous acid, the former being also converted *in ascensu* into nitrous acid.

ACIDUM TARTARICUM.

Tartaric Acid.

Acidum Tartaricum, P. L. 1824.

Composition.—Anhydrous Tartaric Acid consists of—

4 equivalents of Carbon	6 × 4 =	24
5 ——— Oxygen	8 × 5 =	40
2 ——— Hydrogen	1 × 2 =	2
Equivalent		66

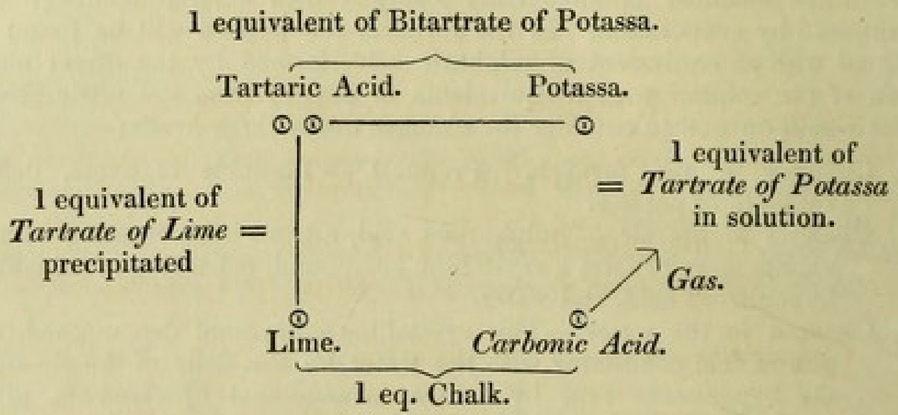
The crystals are constituted of—

1 equivalent of Anhydrous Acid	66
1 ——— Water	9
	75

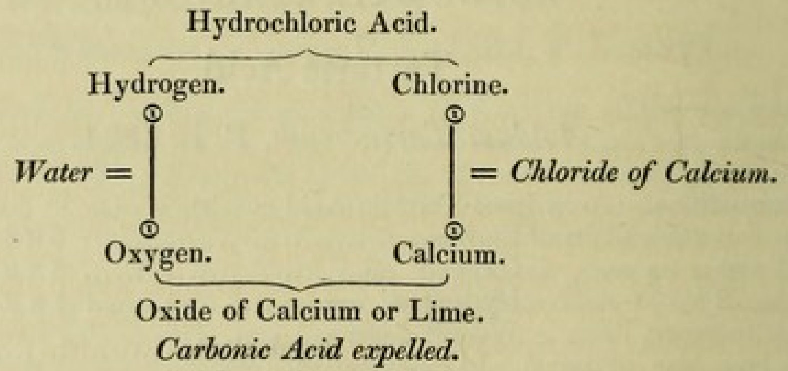
Decomposition.—In boiling the bitartrate of potassa, consisting of 2 equivalents of tartaric acid and 1 equivalent of potassa, with chalk, consisting of 1 equivalent of carbonic acid, and 1 equivalent of lime, half the tartaric acid, or 1 equivalent, unites with the lime to form 1 equivalent of tartrate of lime, which is precipitated, and a tartrate of potassa is left in solution. Having separated this portion of tartrate of lime, we proceed by a distinct process to obtain another portion of tartrate of lime; first, by the action of hydrochloric acid on a distinct proportion of chalk, which forms chloride of calcium and water; and next, by adding this solution of chloride of calcium to the residuary solution of tartrate of potassa.

The chlorine combines with the potassium of the potassa, and forms a chloride of potassium, while the oxygen of the potassa unites with the calcium to form lime, which being attracted by the tartaric acid constitutes the second portion of tartrate of lime. Both portions are then decomposed by diluted sulphuric acid, which unites with the whole of the lime, and the tartaric acid remains in solution to be afterwards crystallized:—

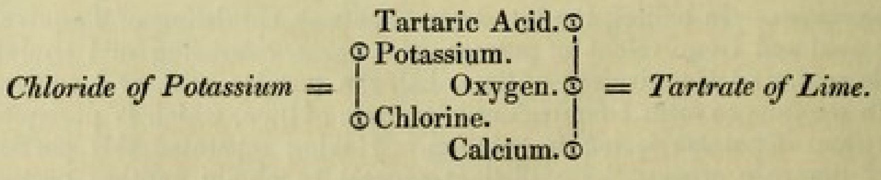
Stage 1.—*Products.*—Tartrate of Lime precipitated.
Tartrate of Potassa in solution.
Carbonic Acid Gas given off.



Stage 2.—*Products.*—Process to obtain a solution of Chloride of Calcium.
Chloride of Calcium in solution.
Water.
Carbonic Acid Gas revolved.



Stage 3.—*Products.*—Tartrate of Lime precipitated.
Chloride of Potassium in solution.



Stage 4.—*Products.*—Sulphate of Lime precipitated.
Tartaric Acid left in solution to be crystallized.

ÆTHEREA.

Æthers.

ÆTHER SULPHURICUS.

Sulphuric Æther.

Æther vitriolicus, P.L. 1788.
Æther rectificatus, P.L. 1809, P.L. 1824.

Composition.—	4 equivalents of Carbon	6 × 4 =	24
	1 equivalent of Oxygen.....	=	8
	5 equivalents of Hydrogen.........	1 × 5 =	5
			37
Or,	2 equivalents of Olefiant Gas......	14 × 2 =	28
	1 equivalent of Vapour of Water	=	9
			37

Decomposition.—2 equivalents of alcohol lose 1 equivalent of water, which is retained by the sulphuric acid in the retort; and the remaining equivalent of water, uniting with the 2 equivalents of olefiant gas, forms 1 equivalent of sulphuric æther: so that it is manifest that 2 equivalents of alcohol are necessary to the formation of 1 equivalent of æther. The nature of the reaction is as yet but imperfectly understood.* Mr. Hennel considers, that in the conversion of alcohol into æther, as a preliminary step, an acid consisting of two equivalents of sulphuric acid, and 1 equivalent of quadrihydrocarbon, or etherine, is formed; which he, after Vogel, terms sulphovinic acid. He considers this acid as the agent by which etherine is first formed, and then so liberated as to unite with the water.

Properties.—Extremely volatile, so that it is impossible to pour it from one bottle into another; or repeatedly to open the vessel containing it without considerable loss by evaporation. It is colourless; has a well-known peculiar smell, a warm taste, and a fragrant odour; respirable in the form of vapour when mixed with atmospheric air. When exposed to the air it forms a portion of acetic acid, and acquires the property of reddening litmus paper. Specific gravity of the purest æther at 55° is ·724: if exceeding this, it contains alcohol absolute, or mixed with water. Its evaporation, from the rapidity with which it occurs, occasions intense cold, sufficient in a cool atmosphere to freeze mercury; and if incessantly dropped on the surface of the human body, it will destroy the part by abstracting heat. It is immiscible with water; to which, however, it imparts its odour, and free alcohol, if any is present. Specific gravity of the college æther is ·750.

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* Read Mitscherlich "Lehrbuch der Chemie;" Berzelius's "System of Chemistry." Dabit "Annales de Chim." xxiv. 289; and "Philosoph. Transact.," 1826 and 1829.

OLEUM ÆTHEREUM.

Æthereal Oil.

Oleum Vini, P. L. 1788.
Oleum Æthereum, P. L. 1809, P. L. 1824.

Composition.—1 equivalent of Sulphuric Acid = 40
9 ——— Carbon .... 6 × 9 = 54
9 ——— Hydrogen...... 1 × 9 = 9
103 according to Hennell.

There are several other analyses with which it is scarcely expedient to trouble the reader, since, at present, they are all uncertain. It has been conjectured to consist of uncertain equivalents of æther and sulphuric acid; and, therefore, it has been termed sulphate of æther, and sulphatic æther.

Decomposition.—In forming sulphuric æther it will be seen that we employ 3 parts alcohol to 2 sulphuric acid. In the present process we have 4 parts acid to 2 of alcohol, and to this difference of proportion, the variation in the actions and results are altogether to be ascribed. The energetic affinity for water exerted by the acid, decomposes the æther that would otherwise result; some olefiant gas is evolved, and the oil of wine collects in the receiver in the form of a yellowish fluid, constituted as above stated.

Properties.—Colour, yellowish; odour, aromatic; taste, pungent. It is of an oily consistence, sp. gr. 1·333. It does not affect test-paper; it is nearly insoluble in water, but freely soluble in alcohol and sulphuric æther. When evaporated with an alkali, or simply boiled with a little water, it is converted into olefiant gas and sulpho-vinic acid.

SPIRITUS ÆTHERIS NITRICI.

Spirit of Nitric Æther.

Spiritus Nitri dulcis, P. L. 1745.
Spiritus Ætheris nitrosi, P. L. 1788.
Spiritus Ætheris nitrici, P. L. 1809, P. L. 1824.

Composition.—Hyponitrous Acid, 1 equivalent.................... = 38
Æther . ... 1 ——— .... = 37
Equivalent...... 75

Decomposition.—The alcohol is converted into æther, and the nitric acid, reduced to hyponitrous acid, unites with the æther to form nitrous æther. Azote, protoxide of azote, binoxide of azote, and carbonic acid, are the gases evolved.

Commentary.—The acid should be gradually, and by instalments, added to the spirit, and the operator should wait to allow the mixed fluid to cool after each successive addition of acid. He should then distil in a very gentle temperature, and collect the æther in a Woulfe's apparatus.

Properties.—More volatile than sulphuric æther, but possessing many properties in common with it: odour, fragrant; taste, pungent and acidulous; sp. gr.

·834, intermediate between alcohol, which is lighter, and water, which is heavier, than this fluid. When quite pure it is neutral to test-paper, but by long keeping it spontaneously resolves itself into alcohol, nitrous acid, and a little acetic acid, and a similar change is instantly effected by mixing this æther with water, or by distilling it at a higher temperature. When added (as in the common citrate-saline mixture) to potassa, it forms nitrite, or hyponitrite of potassa, which is itself a powerful diuretic. In this case the alkali of the mixture should be used in excess, so as to leave enough to neutralize the hyponitrous or nitrous acids, and in dropsies such a combination has been in our hands decidedly efficacious. Spirit of nitric æther coagulates the tincture of guiacum, to which it imparts a deep blue colour, and strikes a deep olive with a solution of sulphate of iron.

SPIRITUS ÆTHERIS SULPHURICI COMPOSITUS.

Compound Spirit of Sulphuric Æther.

Spiritus Ætheris vitriolici compositus, P. L. 1788.
Spiritus Ætheris compositus, P. L. 1809.
Spiritus Ætheris sulphurici compositus, P. L. 1824.

(Hoffman's Anodyne Liquor).

Composition.—A solution or mixture of æthereal oil and sulphuric æther in rectified spirit. In the last Pharmacopœia this compound was directed to be prepared by adding 2 fluidrachms of æthereal oil to 16 fluidounces of spirit of sulphuric æther. From the present the spirit of sulphuric æther is excluded, and the compound spirit is prepared with sulphuric æther, æthereal oil, and rectified spirit, with the ostensible reason of rendering it more miscible with water; but in reality it is just the same preparation, save and except that it contains 3 fluidrachms of æthereal oil instead of 2 fluidrachms as heretofore.

ALKALINA.

Alkalies.

ACONITINA.

Aconitina or Aconitine.

Composition.—C H A O s, in undetermined proportions.

Decomposition.—If we are to assume that the aconitina resides in the aconite root, in combination with some acid as yet unknown, the theory of the decomposition will be as follows:—The three boilings in spirit, the distillation of the spirit, the solution of the alcoholic extract in water, and the evaporation of the watery solution to the consistence of syrup, are all preliminary. On adding the diluted sulphuric acid, it dissolves the aconitina, and forms a sulphate of that alkaloid. The liquor of ammonia precipitates the aconitina, and a soluble sulphate of ammonia is left. The aconitina is again combined with, and dissolved by, a fresh portion of dilute sulphuric acid, then purified by animal charcoal, and again precipitated by liquid ammonia, and finally it is directed to be washed and dried.

Properties.—For the properties of aconitina, the various species of the aconitum, and the history of the plant, *vide* the section of "Poisons, their signs, antidotes, and tests."

AMMONIÆ SESQUICARBONAS.

Sesquicarbonate of Ammonia.

Sal Volatilis, P. L. 1720.
Sal Volatilis salis Ammoniaci, P. L. 1745.
Ammonia præparata, P. L. 1788.
Ammoniæ Carbonas, P. L. 1809.
Ammoniæ Subcarbonas, P. L. 1824.

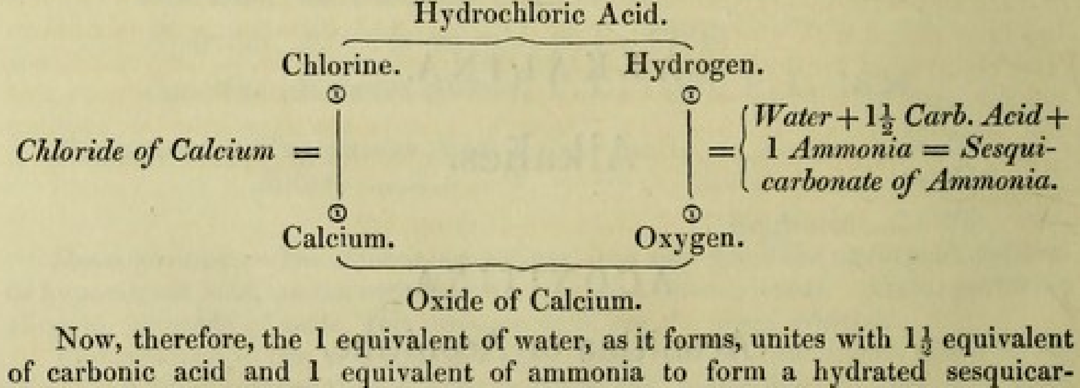
Six names in 116 years! The name seems also to have been volatile.

Composition.—1 equivalent of Ammonia .... = 17
$1\frac{1}{2}$ ——— Carbonic Acid........... = 33
1 ——— Water.................... = 9
59

Or,

2 equivalents of Ammonia ...... 17 × 2 = 34
3 ——— Carbonic Acid... 22 × 3 = 66
2 ——— Water......... 9 × 2 = 18
118

Decomposition.—This may be simplified by considering that a double decomposition first takes place between the elements of the hydrochloric acid and the lime; thus yielding chloride of calcium and water; the ingredients being hydrochlorate of ammonia and chalk.



Now, therefore, the 1 equivalent of water, as it forms, unites with $1\frac{1}{2}$ equivalent of carbonic acid and 1 equivalent of ammonia to form a hydrated sesquicarbonate of ammonia. The other $\frac{1}{2}$ equivalent of ammonia escapes.

Properties.—This salt is mediate between the carbonate and bicarbonate of ammonia. It consists of white masses, which when recently prepared are transparent, but which gradually become more or less opaque. Its odour is penetrating and pungent; its taste, hot and saline; it turns turmeric paper of a reddish brown, and has an alkaline reaction on other vegetable colours also. By long exposure to the air it gives off carbonate of ammonia, and effloresces into a residue, which is a bicarbonate, the equivalents being just adequate for the formation of these two salts out of the sesquicarbonate. The bicarbonate is purposely formed in this way by some practitioners, who prefer this last salt as a remedy, dissolved in bitter infusion, for indigestion. At the temperature of 60° it requires four times its weight of water for solution. It is insoluble in alcohol, and it is partly volatilized and decomposed by hot water.

LIQUOR AMMONIÆ SESQUICARBONATIS.

Liquor of Sesquicarbonate of Ammonia.

Spiritus Salis Ammoniaci, P. L. 1720, P. L. 1745.
Aqua Ammoniæ, P. L. 1788.
Liquor Ammoniæ Carbonatis, P. L. 1809.
Liquor Ammoniæ Subcarbonatis, P. L. 1824.

LIQUOR AMMONIÆ.

Liquor of Ammonia.

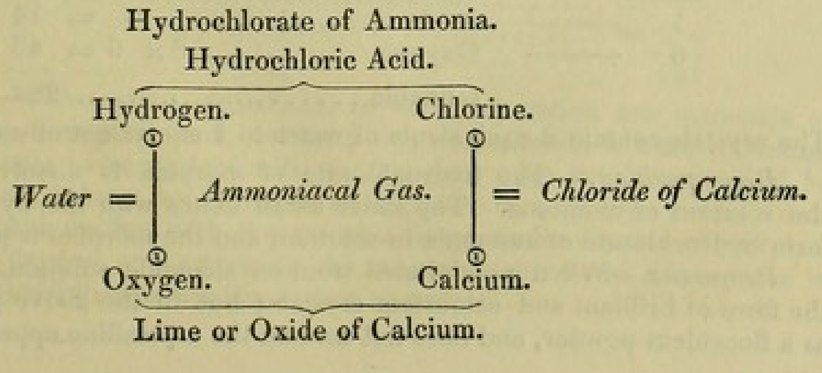
Aqua Ammoniæ, P. L. 1788.
Liquor Ammoniæ, P. L. 1809, P. L. 1824.

Composition.—Ammoniacal gas consists of—

$$\begin{array}{lr} \text{3 equivalents of Hydrogen.... } 1 \times 3 = & 3 \\ \text{1 ——— Azote........ } = & \underline{14} \\ & 17 \end{array}$$

$$\begin{array}{rr} \text{The solution contains 10 per cent of this Gas..} & 10 \\ \text{Water} & \underline{90} \\ & 100 \end{array}$$

Decomposition.—Hydrochlorate of ammonia is thrown into a retort, containing lime slaked with water: lime, it must be recollected, is an oxide of calcium. The chlorine of the hydrochloric acid unites with the calcium to form chloride of calcium; while its hydrogen, attracting the oxygen of the lime, forms water: thus the ammonia being set free in the form of gas, passes over into the receiver, where it is greedily absorbed by the water, the chloride of calcium remaining in solution.



Properties.—Ammoniacal gas is invisible; has an overpowering pungent odour, and an acrid caustic taste. It is permanently elastic at common temperatures, and its sp. gr. is 0·76. It has the usual alkaline reaction on vegetable colours, changing the blues to green, and the yellows to red; 100 cubic inches weigh 18·19 grains. It is irrespirable, extinguishes flame, but may be burned when issuing from a capillary orifice in an atmosphere of oxygen. At the temperature of 50° under the pressure of six atmospheres and a half, it was converted by Faraday into a colourless transparent fluid, having a sp. gr. of 0·76. One cubic inch of water at 50° absorbs 670 cubic inches of this gas, and the saturated solution has a sp. gr. of 0·875. The sp. gr. of the above solution is 0·96, and its strength is estimated at 10 per cent.

LIQUOR AMMONIÆ ACETATIS.

Liquor of Acetate of Ammonia.

(Spirit of Mindererus.)

Much complaint has been made of the present proportions; but here the error is with the critics. Distilled Vinegar ought to contain 4·6 per cent of acetic acid; if it contain only 3 per cent, of course the quantity of the sesquicarbonate will be superabundant. This is a question entirely between the dispenser and the tradesman who supplies him with the acid. Again, if we purchase pyroligneous acid of 3 per cent, we commit two errors at one and the same time: first, we have comparatively an impure acid; and, secondly, from its weakness, we shall not have the due proportion of the acetate of ammonia in any given quantity of the liquor. So, again, those gentlemen who complain of the alteration in the quantity of the sesquicarbonate are alike at fault: we now have four ounces and a half in two pints of 40 fluidounces; we formerly had two ounces to 32 fluidounces, so that the proportions are exactly the same.

MORPHIA.

Morphia.

Composition.—C H A O s.

Anhydrous morphia consists of the usual elements of the alkaloids, and the following proportions:—

				Liebig.
34 equivalents of	Carbon	6 × 34 =	204	or 71·80
18 ———	Hydrogen	=	18	6·34
1 ———	Azote	=	14	4·96
6 ———	Oxygen	8 × 6 =	48	16·90
	salifiable		284	100

The crystals contain 2 equivalents of water to 1 equivalent of morphia.

Decomposition.—The hydrochlorate of morphia is dissolved, and added to the solution of ammonia. The latter alkali unites with the hydrochloric acid to form hydrochlorate of ammonia in solution, and the morphia is precipitated.

Properties.—When precipitated from an alcoholic solution, morphia assumes the form of brilliant and colourless crystals; but, in the above process, it appears as a flocculent powder, and does not assume the crystalline appearance until it has been stirred and allowed to stand. Morphia, though insoluble in water, is soluble in the saliva of the mouth, to which it imparts an extremely bitter taste. It requires for its solution 100 parts even of boiling water. It dissolves in 40 parts of cold alcohol, and in 30 of boiling absolute alcohol. It is almost insoluble in æther, in which fluid narcotine is readily dissolved; hence it is the usual mode of freeing it from this last impurity. One pound of Turkey opium yields about an ounce of morphia. When the crystals of morphia are submitted to a gentle heat they become opaque, and at a higher temperature they fuse into a yellow liquid, which, as it cools, becomes white and crystalline.

MORPHIÆ ACETAS.

Acetate of Morphia.

Composition.—1 equivalent of Acetic Acid ...... = 51 or 15·23

1 ——— Morphia.......... = 284 84·77

335 100

The salt, as obtained by evaporation to dryness, is stronger than the crystals, which no doubt contain water. Hence the discrepancy of the dose, which, by some of the most experienced physicians, has been estimated at $\frac{1}{6}$ of a grain, while $\frac{1}{3}$ of a grain of our acetate is said to be scarcely equal to one grain of opium.

Chemical Process.—It is a direct union of morphia and acetic acid, the latter agent being added to the point of saturation.

Properties.—The above solution crystallizes, not without difficulty, in acicular bundles; and, during the requisite evaporation, part of the acetic acid is sometimes dissipated, and it requires more acetic acid to dissolve it. Hence the uncertainty of its composition. The crystals are readily soluble in water, less soluble in alcohol. They are deliquescent, and not easily preserved in a constant state of dryness. Even when perfectly neutral, this salt is partially decomposed by water, and some morphia is precipitated. It is obvious, that the only form in which the acetate of morphia can be used with effect is in a solution of given strength in dilute acetic acid.

MORPHIÆ HYDROCHLORAS.

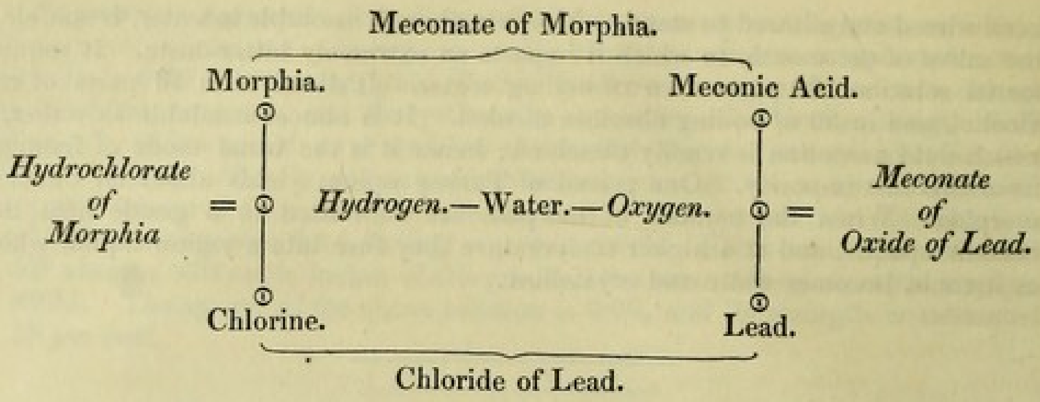
Hydrochlorate of Morphia.

Composition.—1 equivalent of Hydrochloric Acid .... = 37

1 ——— Morphia .... = 284

321

Decomposition.—The acting ingredients in this preparation are meconate of morphia, consisting of meconic acid and morphia; and chloride of lead, consisting of chlorine and lead. The student will cast his eyes over the diagram and he will see that chlorine, taking up hydrogen as it passes through the water, forms hydrochloric acid, and uniting with the morphia forms hydrochlorate of morphia. The lead takes the oxygen, and, attracting the meconic acid, forms a meconate of lead. Charcoal is used to separate the colouring matter.



Properties.—Crystals plumose, acicular; when pure, colourless; but, as often met with, they have a white-brown colour; inodorous; taste, bitter. Soluble in about 20 parts of water, and from a saturated solution in boiling water crystals are deposited on cooling. They have hitherto been considered as anhydrous; but Messrs. Hennell and Phillips represent them to contain 6 equivalents of water.

QUINÆ DISULPHAS.

Disulphate of Quina.

Commercial Name.—Sulphate of Quinine.

Composition of Quina.—C H A O s; that is to say,

20 equivalents of	C arbon	6 × 20 =	120
12 ——	H ydrogen	1 × 12 =	12
1 ——	A zote	=	14
2 ——	O xygen	8 × 2 =	16
Forming a s alifiable base.	Equivalent....		162

Composition of Disulphate of Quina.—

1 equivalent of Sulphuric Acid	=	40 or	9·17
2 equivalents of Quina	162 × 2 =	324	74·31
8 —— Water	9 × 8 =	72	16·52
		436 in	100 parts.

Decomposition.—Firstly, bruised cinchona is repeatedly boiled with largely diluted sulphuric acid.

Products.—The kinate of quina, naturally contained in the bark, is dissolved out by the mineral acid; and thus you have in the solution kinic acid, quina, and sulphuric acid.

Secondly, Oxide of lead is added nearly to saturation.

Products.—Sulphate of lead precipitated; kinate of quina, or kinic acid and quina, remaining in solution.

Thirdly, Liquor of ammonia is gradually added to combine with the kinic acid, and precipitate the quina, which is then combined with the due quantity of sulphuric acid to form the disulphate; and the colouring matter is got rid of by digestion with animal charcoal.

Properties.—Crystals long, acicular, pearly, bitter to the taste, efflorescent.

Soluble in 740 parts of cold and 30 of boiling water. Soluble in 80 parts of alcohol, of specific gravity ·850; and in a much smaller proportion of boiling alcohol of the same strength. It fuses when heated, and takes on the appearance of melted wax, and afterwards reddens and begins to decompose. Burnt in the open air, it passes first into a bulky mass of charcoal, and afterwards it is gradually and entirely consumed. When heated to 212° it is luminous. N. B.—It is commonly adulterated with water, sugar, gum, starch, salts of ammonia, gypsum, sulphate of magnesia, acetate of lime, which are all alien to the tonic indication. Sulphate of zinc might, however, be mixed by the practitioner with advantage, for the purposes of economy, in the proportion of one-third.

Commentary.—The cinchona lancifolia chiefly contains the alkali called cinchonia; the quina is principally derived from the cinchona cordifolia; the cinchona oblongifolia contains both these alkaloids.

STRYCHNIA.

Strychnia.

Composition.—C H A O s.

30	equivalents of	Carbon	6 × 30 =	180
16	———	Hydrogen	1 × 16 =	16
1	———	Azote	=	14
3	———	Oxygen......	8 × 3 =	24
		salifiable		234

The terminal *s* in the above symbolic word C H A O s, as I have said before, denotes that the alkali is salifiable.

Decomposition.—Nux vomica consists of

Strychnia }
Brucia .. } existing as strychnates.
Strychnic Acid.
Vegetable impurities.

An alcoholic extract of the nux vomica is first prepared, and this is dissolved in cold water, strained, and evaporated to the consistence of a syrup. Magnesia is added, which unites with the strychnic acid to form strychnate of magnesia; and the strychnia remaining mixed with this magnesian salt, is afterwards dissolved by the boiling spirit. The spirit being distilled, the residuary strychnia is saturated with diluted sulphuric acid, to form a sulphate of strychnia; and this salt is in its turn decomposed by liquor of ammonia, which forms a sulphate of ammonia, while the strychnia is precipitated because insoluble.

Properties.—Strychnia (discovered by Pelletier and Caventou in 1818) is contained in four or five different species of *Strychnos*, but in the above process it is directed to be prepared from the strychnos nux vomica. It is colourless, inodorous, and so intensely bitter, that a cold aqueous solution containing less than $\frac{1}{6000}$ of its weight of strychnia, may be further diluted with 100 times its bulk of water, and yet remain sensibly bitter. It is almost insoluble in cold water, and even in boiling water one part requires 2500 parts for solution. It is soluble in common alcohol, but insoluble in absolute alcohol and in æther. It has an alkaline reaction on vegetable colours, and forms salts with various acids. It is reddened by the addition of strong nitric acid; but this red tint, according to Pelletier, is due to the presence of some impurity, probably brucia.

VERATRIA.

Veratria.

Composition.—C H A O s.

34 equivalents of	Carbon......	$6 \times 34 =$	204	or 70·83
22 ———	Hydrogen ...	$1 \times 22 =$	22	7·63
1 ———	Azote	$=$	14	16·66
6 ———	Oxygen	$8 \times 6 =$	48	4·88
	salifiable		288	100

Decomposition.—Cevadilla seeds contain gallate of veratria. The bruised seeds are boiled three times in successive additions of the spirit, and this alcoholic tincture is reduced to an extract by distillation, which separates the spirit. The residue is decomposed by boiling it in water slightly acidulated with sulphuric acid.

Product.—Sulphate of veratria left in solution.

Secondly, Magnesia is now employed to precipitate the veratria.

Products.—Veratria precipitated. Sulphate of magnesia left in solution. Nextly, the veratria is redissolved, and digested in spirit, to detach it from impurities. The spirit is again distilled off, and the veratria treated with largely diluted sulphuric acid and charcoal.

Product.—Sulphate of veratria decolorized and in solution.

Lastly, Liquor of ammonia is added to precipitate the veratria now sufficiently pure.

Products.—Veratria precipitated. Sulphate of ammonia in solution.

Properties.—Veratria is white and pulverulent, and has not been obtained in crystals. It is inodorous, and has an acrid burning taste. It fuses at 280°, and on cooling it becomes a transparent yellowish mass. It may be considered as all but insoluble in cold water, and it requires 1000 times its weight of boiling water for its solution. It is readily soluble in alcohol, less so in æther. It has an alkaline reaction, and neutralizes acids, but as a base it is weaker than the preceding alkaloids. In an exceedingly minute quantity it acts with singular energy on the membrane of the nose, exciting violent sneezings. When taken internally, it produces irritation of the mucous lining of the stomach and bowels.

ANIMALIA.

Animal Preparations.

CARBO ANIMALIS PURIFICATUS.

Commercial Name.—Ivory Black.

Process.—The diluted hydrochloric acid is used to dissolve out the earthy phosphate and carbonate, which, if allowed to remain, would render the charcoal unfit for decolorization, in preparing certain of the vegetable alkalies. It is one form of carbon.

Mnemonic Symbol for the composition of Bone (human):

A. L. M. S.

A. Animal Matter, viz. gelatine, fat, albumen.
L. Lime, Phosphate of, Carbonate, Fluate.
M. Magnesia, Phosphate of
S. Salt, Common (Chloride of Sodium).

Properties.—Charcoal is a black, insoluble, inodorous, insipid, brittle substance; an excellent conductor of electricity, but a bad conductor of heat; unchanged by the combined action of air and moisture at all common temperatures, and readily combustible in oxygen. Animal Charcoal, together with these properties, has a peculiar lustre and porosity, upon which its superior discolouring power over vegetable charcoal is said to depend.

Commentary.—The wholesale manufacturer does not always employ animal charcoal to decolorate his crystals. Some years ago it was supposed no other material would answer for this purpose, and a dead dog or pig from the river was greedily received at the factories, and paid for according to the size.

CORNU USTUM.

Burnt Horn.

Composition.—The animal matter being driven off by the heat, a sub-sesquiphosphate of lime, or bone-earth, remains nearly pure, consisting of—

1 equivalent of	Phosphoric Acid....		= 36	or 46·2
1½ ———	Lime	28 + 14	= 42	53·8
			78	100

Commentary.—The hartshorn was selected on the ground of its containing a greater portion of the phosphate, and less of the albumen. We know of no preparation in which burnt horn is a direct ingredient in the present Pharmacopœia. It is indeed contained in the pulvis antimonialis, but there the hartshorn shavings are employed, and burnt with the antimony. When we come to the article Pulvis Antimonialis, we shall perhaps be able to shew our readers why burnt horn is retained in the Pharmacopœia. The pulvis cornu usti, the only preparation for which it was employed, is now rejected.

TESTÆ PRÆPARATÆ.

Prepared Shells.

Composition.—Carbonate of Lime with indurated albumen in mother-of-pearl shells, and in the porcelaneous with gelatine.

AQUÆ DESTILLATÆ.

Distilled Waters.

AQUA DESTILLATA.

Distilled Water.

AQUA ANETHI.

Dill Water.

Aqua Seminum Anethi, **P. L. 1745.**
Aqua Anethi, **P. L. 1788, P. L. 1809, P. L. 1824.**

AQUA CARUI.

Carraway Water.

Aqua Seminum Carui, **P. L. 1745.**
Aqua Carui, **P. L. 1809, P. L. 1924.**

AQUA FŒNICULI.

Fennel Water.

Aqua Fœniculi, **P. L. 1745, P. L. 1788, P. L. 1809. P. L. 1824.**

AQUA FLORUM AURANTII.

Orange Flower Water.

AQUA CINNAMOMI.

Cinnamon Water.

Aqua Cinnamomi tenuis, P. L. 1720.
Aqua Cinnamomi simplex, P. L. 1745.
Aqua Cinnamomi, P. L. 1788, P. L. 1809, P. L. 1824.

AQUA MENTHÆ PIPERITÆ.

Peppermint Water.

Aqua Menthæ Piperitidis simplex, P. L. 1745.
Aqua Menthæ Piperitidis, P. L. 1788.
Aqua Menthæ Piperitæ, P. L. 1809, P. L. 1824.

AQUA MENTHÆ PULEGII.

Pennyroyal Water.

Aqua Pulegii simplex, P. L. 1745.
Aqua Pulegii, P. L. 1788, P. L. 1809, P. L. 1824.

AQUA MENTHÆ VIRIDIS.

Spearmint Water.

Aqua Menthæ vulgaris simplex, P. L. 1745.
Aqua Menthæ sativæ, P. L. 1788.
Aquæ Menthæ viridis, P. L 1809, P. L. 1824.

AQUA PIMENTÆ.

Pimenta Water.

Aqua Piperis Jamaicensis, P. L. 1745.
Aqua Pimento, P. L. 1788.
Aqua Pimentæ, P. L. 1809, P. L. 1824.

AQUA ROSÆ.

Rose Water.

Aqua Rosarum Damascenarum, P. L. 1745.
Aqua Rosæ, P. L. 1788, P. L. 1809, P. L. 1824.

AQUA SAMBUCI.

Water of Elderflower.

Note.—In line 1, page 75, of my Pharmacopœia, *for* parts, *read* pints.

To answer many inquiries where the Oleum Sambuci is to be obtained, the Collegiate Translator hath called up the ghost of Dr. Lewis, who hath gravely informed him that elder flowers yield by distillation but a very small quantity of a viscid oil.[*]

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[*] I hope my old, sometime pupil, Dr. Conolly, will read his recantation of some four or five errors in criticism; and, at all events, not ascribe it to any ignorance that I do not know where to procure oil of elder. By adulation and glossing over the injustice and errors of fools, he may have at last got a comfortable (?) berth among madmen; but let him be careful how he again plays that card at my expense. Although he may *affect* not to know (so he states) "what are Dr. Collier's claims on the fellows and licentiates of the College of Physicians," I can tell him that if *he* be ignorant, because forgetful of services, there is much more excuse for those who choose to forget after having paid for them. "Haud ictus sapio."—Written acknowledgements surely ought to mean something. Was no cock near to crow while the ex-professor wrote the sentence? But I ask pardon for the comparison; Peter was not such a blockhead as to hazard a voluntary renunciation. Verily the habits of a reviewer would corrupt the ethereal mind of a recording angel.

CATAPLASMATA.

Poultices.

CATAPLASMA CONII.

Cataplasm of Hemlock.

CATAPLASMA FERMENTI.

Cataplasm of Yest.

CATAPLASMA LINI.

Cataplasm of Linseed.

CATAPLASMA SINAPIS.

Cataplasm of Mustard.

Commentary.—As the poultices in the College Pharmacopœia are limited to four, I have thought fit to add certain others, which may be convenient to the practitioner, and will be found in the Addenda.

CERATA.

Cerates.

CERATUM.

Cerate.

Ceratum, P. L. 1809.
Ceratum simplex, P. L. 1824.

CERATUM CALAMINÆ.

Cerate of Calamine.

Ceratum Epuloticum, P. L. 1745.
Ceratum Lapidis Calaminaris, P. L. 1788.
Ceratum Calaminæ, P. L. 1809, P. L. 1824.

CERATUM CANTHARIDIS.

Cerate of Cantharides.

Ceratum Cantharidis, P. L. 1788.
Ceratum Lyttæ, P. L. 1809.
Ceratum Cantharidis, P. L. 1824.

CERATUM CETACEI.

Cerate of Spermaceti.

Ceratum Album, P. L. 1745.
Ceratum Spermatis Ceti, P. L. 1788.
Ceratum Cetacei, P. L. 1809, P. L. 1824.

CERATUM HYDRARGYRI COMPOSITUM.

Compound Cerate of Mercury.

CERATUM PLUMBI ACETATIS.

Cerate of Acetate of Lead.

Unguentum Cerussæ Acetatæ, P. L. 1788.
Ceratum Plumbi Superacetatis, P. L. 1809.
Ceratum Plumbi Acetatis, P. L. 1824.

CERATUM PLUMBI COMPOSITUM.

Compound Cerate of Lead.

Ceratum Lithargyri Acetati, P. L. 1809.
Ceratum Plumbi compositum, P. L. 1824.

CERATUM RESINÆ.

Cerate of Resin.

Ceratum Citrinum, P. L. 1745.
Ceratum Resinæ flavæ, P. L. 1788.
Ceratum Resinæ, P. L. 1809, P. L. 1824.

CERATUM SABINÆ.

Cerate of Savine.

Ceratum Sabinæ, P. L. 1809, P. L. 1824.

CERATUM SAPONIS.

Cerate of Soap.

Ceratum Saponis, P. L. 1788, P. L. 1809, P. L. 1824.

CONFECTIONES.

Confections.

CONFECTIO AMYGDALÆ.

Confection of Almonds.

Confectio Amygdalæ, P. L. 1809.
Confectio Amygdalarum, P. L. 1809, editio altera, P. L. 1824.

CONFECTIO AROMATICA.

Aromatic Confection.

Confectio Raleighana, P. L. 1720.
Confectio Cardiaca, P. L. 1745.
Confectio Aromatica, P. L. 1788, P. L. 1809, P. L. 1824.

CONFECTIO AURANTII.

Confection of Orange.

Conserva flavedinis Corticum Aurantiorum, P. L. 1720, P. L. 1745.
Conserva Corticis exterioris Aurantii Hispalensis, P. L. 1788.
Confectio Aurantii, P. L. 1809.
Confectio Aurantiorum, P. L. 1824.

CONFECTIO CASSIÆ.

Confection of Cassia.

Electuarium e Cassia, P. L. 1745.
Electuarium Cassiæ, P. L. 1788.
Confectio Cassiæ, P. L. 1809, P. L. 1824.

CONFECTIO OPII.

Confection of Opium.

Philonium Romanum, P. L. 1720.
Philonium Londinense, P. L. 1745.
Confectio Opiata, P. L. 1788.
Confectio Opii, P. L. 1809, P. L. 1824.

CONFECTIO PIPERIS NIGRI.

Confection of Black Pepper.

Confectio Piperis Nigri. P. L. 1824.

CONFECTIO ROSÆ CANINÆ.

Confection of Dog Rose [Hips].

Conserva Fructûs Cynosbati, P. L. 1720, P. L. 1745.
Conserva Cynosbati, P. L. 1788.
Confectio Rosæ Caninæ, P. L. 1809, P. L. 1824.

CONFECTIO ROSÆ GALLICÆ.

Confection of the French Rose [Red].

Conserva Rosarum rubrarum, P. L. 1720, P. 1745.
Conserva Rosæ, P. L. 1788.
Conserva Rosæ Gallicæ, P. L. 1809, P. L. 1824.

CONFECTIO RUTÆ.

Confection of Rue.

Electarium e Baccis Lauri, P. L. 1720, P. L. 1745.
Confectio Rutæ, P. L. 1809, P. L. 1824.

CONFECTIO SCAMMONII.

Confection of Scammony.

Electarium Caryocostinum, P. L. 1720.
Electarium e Scammonio, P. L. 1745.
Electuarium Scammonii, P. L. 1788.
Confectio Scammoneæ, P. L. 1809, P. L. 1824.

CONFECTIO SENNÆ.

Confection of Senna.

Electarium Lenitivum, P. L. 1720, P. L. 1745.
Electuarium Sennæ, P. L. 1788.
Confectio Sennæ, P. L. 1809, P. L. 1824.

The plan of keeping the mixed ingredients in a dry state is a considerable improvement, but in the first confection (Confectio Amygdalæ), " the College have omitted to order the addition of water. It should have been, then, whenever the confection is to be used," add water gradually, and pound all the ingredients, &c.

DECOCTA.

Decoctions.

DECOCTUM ALOËS COMPOSITUM.

Compound Decoction of Aloes.

Decoctum Aloës Compositum, P. L. 1809, P. L. 1824.

DECOCTUM AMYLI.

Decoction of Starch.

Mucilago Amyli, P. L. 1788, P. L. 1809, P. L. 1824.

DECOCTUM CETRARIÆ.

Decoction of Liverwort.

Decoctum Lichensis, P. L. 1809, P. L. 1824.

DECOCTUM CHIMAPHILÆ.

Decoction of Winter-green or Pyrola.*

DECOCTUM CINCHONÆ CORDIFOLIÆ.

Decoction of Heart-leaved Cinchona [Yellow].

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* By reference to page 87 of my Pharmacopœia, it will be seen that I have given a formula for an infusion of Pyrola, which I am myself in the habit of using.

DECOCTUM CINCHONÆ LANCIFOLIÆ.

Decoction of Lance-leaved or Pale Bark.

Decoctum Cinchonæ, P. L. 1788, P. L. 1809, P. L. 1824.

We remarked in the caution, page 87, that this bark contains also quina, *i. e.* in addition to Cinchona; but, according to MM. Pelletier and Caventou, it contains no quina. When we call to mind that the forests of Peru yield at least twelve species of Cinchona, according to Mutis, we need not be surprised at the difference in the analyses. Cinchonia is the active alkali of this species, and, if it contain quina, the quantity is almost inappreciable.

DECOCTUM CINCHONÆ OBLONGIFOLIÆ.

Decoction of Oblong-leaved Cinchona [Red].

DECOCTUM CYDONIÆ.

Decoction of Quince [Seeds].

Mucilago Seminis Cydonii Mali, P. L. 1788.
Decoctum Cydoniæ, P. L. 1809, P. L. 1824.

DECOCTUM DULCAMARÆ.

Decoction of Woody Nightshade.

Decoctum Dulcamaræ, P. L. 1809, P. L. 1824.

DECOCTUM GRANATI.

Decoction of Pomegranate.

DECOCTUM HORDEI.

Decoction of Barley.

Decoctum Hordei, P. L. 1788, P. L. 1809, P. L. 1824.

DECOCTUM HORDEI COMPOSITUM.

Compound Decoction of Barley.

Decoctum Hordei Compositum, P. L. 1788, P. L. 1809, P. L. 1824.

DECOCTUM MALVÆ COMPOSITUM.

Compound Decoction of Mallow.

Decoctum Malvæ Compositum, P. L. 1809, P. L. 1824.

DECOCTUM PAPAVERIS.

Decoction of Poppy.

Decoctum Papaveris, P. L. 1809, P. L. 1824.

DECOCTUM QUERCUS.

Decoction of Oak [Bark].

Decoctum Quercûs, P. L. 1809, P. L. 1824.

DECOCTUM SARZÆ.

Decoction of Sarsaparilla.

Decoctum Sarsaparillæ, P. L. 1788, P. L. 1809, P. L. 1824.

DECOCTUM SARZÆ COMPOSITUM.

Compound Decoction of Sarsaparilla.

Decoctum Sarsaparillæ Compositum, P.L. 1788, P.L. 1809, P.L. 1824.

DECOCTUM SCOPARII COMPOSITUM.

Compound Decoction of Broom.

DECOCTUM SENEGÆ.

Decoction of Senega, or American Rattlesnake Root.

Decoctum Senegæ, P. L. 1809, P. L. 1824.

DECOCTUM TORMENTILLÆ.

Decoction of Tormentil.

DECOCTUM ULMI.

Decoction of Elm.

Decoctum Ulmi, P. L. 1788, P. L. 1809, P. L. 1824.

DECOCTUM UVÆ URSI.

Decoction of Whortleberry.

DECOCTUM VERATRI.

Decoction of White Hellebore.

Decoctum Hellebori Albi, P. L. 1788.
Decoctum Veratri, P. L. 1809, P. L. 1824.

EMPLASTRA.

Plasters.

EMPLASTRUM AMMONIACI.

Plaster of Ammoniacum.

Emplastrum Ammoniaci, P. L. 1809, P. L. 1824.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO.

Plaster of Ammoniacum with Mercury.

Emplastrum ex Ammoniaco cum Mercurio, P. L. 1745.
Emplastrum Ammoniaci cum Hydrargyro, P. L. 1788, P. L. 1809, P. L. 1824.

EMPLASTRUM BELLADONNÆ.

Plaster of Deadly Nightshade.

Commentary.—This is a new plaster in our Pharmacopœia, although, as an external application, belladonna has been employed extensively for some years. Dr. W. Chevallier recommended equal parts of the extract and simple cerate in white swelling, and in rheumatic affections. The above form of plaster is used at our hospitals, as a sedative over the region of the heart, in irritability of that organ, and is applied over the sacrum in dysmenorrhœa. I have used it with advantage in painful exostosis.

EMPLASTRUM CANTHARIDIS.

Plaster of Cantharides.

Emplastrum Epispasticum, P. L. 1720.
Emplastrum Vesicatorum, P. L. 1745.
Emplastrum Cantharidis, P. L. 1788.
Emplastrum Lyttæ, P. L. 1809.
Emplastrum Cantharidis, P. L. 1824.

EMPLASTRUM CERÆ.

Plaster of Wax.

Emplastrum Attrahens, P. L. 1745.
Emplastrum Ceræ, P. L. 1788, P. L. 1809, P. L. 1824.

EMPLASTRUM GALBANI.

Plaster of Galbanum.

Diachylon Magnum cum Gummi, P. L. 1720.
Emplastrum Commune cum Gummi, P. L. 1745.
Emplastrum Lithargyri compositum, P. L. 1788.
Emplastrum Galbani compositum, P. L. 1809, P. L. 1824.

EMPLASTRUM HYDRARGYRI.

Plaster of Mercury.

Emplastrum Mercuriale, P. L. 1720.
Emplastrum Commune Mercuriale, P. L. 1745.
Emplastrum Lythargyri cum Hydrargyro, P. L. 1788.
Emplastrum Hydrargyri, P. L. 1809, P. L. 1824.

Commentary.—In this plaster, about eight ounces of oxide of lead exist in admixture (chemical or mechanical?) with three ounces of mercury. It is difficult to imagine what led our predecessors to combine mercury with lead as an external remedy. It is easy to see why they should not have done so. The character of the oxide of lead, as of its salts, is desiccative, repressing, sedative even (if persisted in) to paralysis. That of oxide of mercury and its salts is nearly the reverse, and if it paralyses a part of the body, such effect follows only after a long-continued over-excitement; yet we find this combination in nearly every Pharmacopœia in Europe.—*Cui bono?* As certain oxides of metals are known to unite together in definite proportions, it is not improbable that such compounds will by and by be ushered in as new, efficacious, and invaluable remedies.

EMPLASTRUM OPII.

Plaster of Opium.

Emplastrum Opii, P. L. 1809, P. L. 1824.

EMPLASTRUM PICIS.

Plaster of Pitch.

Emplastrum Cephalicum, P. L. 1745.
Emplastrum Picis Burgundicæ, P. L. 1788.
Emplastrum Picis compositum, P. L. 1809, P. L. 1824.

EMPLASTRUM PLUMBI.

Plaster of Lead.

Diachylon Simplex, P. L. 1720.
Emplastrum Commune, P. L. 1745.
Emplastrum Lithargyri, P. L. 1788.
Emplastrum Plumbi, P. L. 1809, P. L. 1824.

Commentary.—The oldest name for this plaster, and that by which, even now, it is most commonly known in Wales, and many parts of England, is Diapalme; and that is the provincial term for it in France also.

EMPLASTRUM RESINÆ.

Plaster of Resin.

Emplastrum Commune adhæsivum, P. L. 1745.
Emplastrum Lithargyri cum Resina, P. L. 1788.
Emplastrum Resinæ, P. L. 1809, P. L. 1824

EMPLASTRUM SAPONIS.

Plaster of Soap.

Emplastrum e Sapone, P. L. 1720, P. L. 1745.
Emplastrum Saponis, P. L. 1788, P. L. 1809, P. L. 1824.

ENEMATA.

Clysters.

ENEMA ALOËS.

Clyster of Aloes.

ENEMA COLOCYNTHIDIS.

Clyster of Colocynth.

ENEMA OPII.

Clyster of Opium.

ENEMA TABACI.

Clyster of Tobacco.

ENEMA TEREBINTHINÆ.

Clyster of Turpentine.

EXTRACTA.

Extracts.

EXTRACTUM ACONITI.

Extract of Aconite, Monk's Hood, or Wolfsbane.

Extractum Aconiti, P.L. 1809, P.L. 1824.

Characters.—Colour, deep chocolate, almost black; odour, slightly herbaceous; taste, somewhat acrid, leaving a numbness on that part of the tongue to which it has been applied.

This extract is prepared from the leaves, but that from the root is preferred by many. I have taken some pains in comparing the species of aconitum, and the results of my investigation will be found in the section on "Poisons, their signs, tests, and antidotes."

EXTRACTUM BELLADONNÆ.

Extract of Deadly Nightshade.

Extractum Belladonnæ, P.L. 1809, P.L. 1824.

Characters.—Colour, deep chocolate; odour, like that of the fresh-bruised plant; taste, bitter; the inferior preparations smell like tobacco.

Commentary.—We are chiefly indebted to Mr. Brandes for the discovery and description of atropia, the alkaloid principle of belladonna. It is obtained from the root of the plant, dried and powdered, which is said to yield not more than a three-thousandth part of pure atropia. This alkali is colourless, inodorous, and its solution has a bitter taste; it crystallizes in white silky prisms; it is soluble in anhydrous alcohol, in æther, and in about 500 parts of cold water. This last solution readily dilates the pupil if dropped into the eye; it forms definite compounds with the acids; its sulphate and acetate are more crystallizable than the muriate or nitrate. It is precipitated from these four combinations by potassa and ammonia, by infusion of galls, and by the chlorides of gold and platina; with which two last it forms compounds, gradually crystallizing. Heated with potassa, it is easily decomposed with the evolution of ammonia. It consists, according to Liebig, of

$$\begin{array}{lll} C & 68\times 6 = & 408 \\ H & 23\times 1 = & 23 \\ A & 1 \quad = & 14 \\ O & 12\times 8 = & \underline{96} \\ s & & 541 \end{array}$$

EXTRACTUM COLCHICI CORMI.

Extract of the Cormus of Meadow Saffron.

Characters.—I have had no opportunity of observing the characters of this extract. It is not kept in the shops.

EXTRACTUM CONII.

Extract of Hemlock.

Succus Cicutæ Spissatus, P.L. 1788.
Extractum Conii, P.L. 1809, P.L. 1824.

Characters.—Colour, more or less of a bright grass-green ;[*] odour, like that of the fresh-bruised plant, neither rank nor empyreumatic ; it should emit a strong mouse odour on being triturated with caustic potassa.

Commentary.—The active principle of hemlock is *Conia*. It differs from all the others (if we except *nicotina*) in being both fluid and volatile. It is a limpid volatile oil, lighter than water, and possessing a strong disgusting odour, extremely diffusible. It has an acrid taste, and a decided alkaline reaction on turmeric and litmus. It forms salts with acids, not however crystallizable. It imparts its odour and taste to water, in which it is very sparingly soluble. It acquires a dark tint by exposure to the air, and becoming decomposed it evolves ammonia. It boils at 370°. It is a rapid and violent poison. (*Vide* the section on "Poisons," &c., *ad finem.*) It consists of

$$\begin{array}{lll} C & 11 \text{ equivalents} & = 66 \\ H & 12 \text{ ———} & = 12 \\ A & 1 \text{ ———} & = 14 \\ O & 1 \text{ ———} & = \underline{\ 8} \\ s & \text{alifiable} & \ \ 100 \end{array}$$

The extract enters into the Cataplasma Conii and Pilulæ Conii Compositæ.

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[*] I am aware that some operative pharmaceutists impart an artificial green colour to certain extracts. The whole of these characters, are, however, to be relied upon, as distinguishing the genuine from the carbonized extract.

EXTRACTUM DIGITALIS.

Extract of Foxglove.

Characters.—Colour, brownish green; odour, slightly herbaceous; taste, bitter.

Commentary.—M. Leroyer gives a process for obtaining the active principle of foxglove, which is enumerated as an alkaloid and called *Digitalia*. Its properties and habitudes have as yet been imperfectly ascertained. Digitalia, according to M. Leroyer, is brown, of the consistence of pitch, and remarkably deliquescent, slightly alkaline, intensely bitter, and with difficulty, if at all, crystallizable. The experiments made upon several species of animals by Prevost, would serve to shew that it possesses in a high degree the virtues of digitalis.

EXTRACTUM HYOSCYAMI.

Extract of Henbane.

Extractum Hyoscyami, P.L. 1809, P.L. 1824.

Character.—Colour, dark dusky green; odour and taste, strongly virose, and peculiar to the plant.

Commentary.—Hyoscyama, the alkaloid active principle of henbane, is white, inodorous, and of a disagreeable bitter taste. It is very slightly soluble in water, and commonly described as insoluble, but it is very soluble in æther and in alcohol; it yields a white precipitate with tincture of galls, and a yellowish white one with chloride of gold. It has alkaline properties when in a moist state, and unites with acids to form crystalline salts. It yields ammonia under a strong heat, and it most probably consists of C H A Os.

EXTRACTUM LACTUCÆ.

Extract of Lettuce.

Extractum Lactucæ, P. L. 1824.

Characters.—Odour, virose; taste, sweetish, with a mixture of bitter, somewhat like that of opium; colour, brown-black; powerfully attracting moisture from the atmosphere.

Commentary.—The wild lettuce, "Lactuca virosa," is found abundantly in the vicinity of London. It is a biennial indigenous plant, growing on the sides of roads, and flowering in July. The whole plant contains a milky juice, possessing an opiate virose smell, and a bitter subacrid taste. As to the "Lactuca sativa," the quantity of active material contained in it is very slight, compared with that yielded by the wild species. The juice of the garden lettuce is white, that of the wild lettuce is yellow, of a very unpleasant smell, resembling that of opium, and of a bitter nauseous taste. Those who may wish to prepare the extract from the wild lettuce (Lactusa virosa), will find it flowering in July, growing on the road sides and on hedge-banks. Its primary leaves are very large, broad, and a little waved, but not divided at the edges; their colour, pale green. The stalk is round, green, smooth, and rises five feet from the ground, being divided at the top into many branches. The flowers stand at the tops of these branches, numerous, small, and yellow.

Hill, in his "British Herbal," speaks favourably of this plant. "This is one of those English plants which deserve to be more known in medicine: it is called poisonous, and men have been frighted from its use; but it is a very gentle and safe opiate. The best way of giving it is in a syrup, made from a decoction of the fresh leaves and stalk. This I write from experience."—*British Herbal,* page 436.

EXTRACTUM ALOËS PURIFICATUM.

Purified Extract of Aloes.

Extractum Aloës, P. L. 1809.
Extractum Aloës Purificatum, P. L. 1824.

Characters.—Colour, intense chocolate; odour, slightly aromatic; fracture, brittle; taste, intensely bitter.

EXTRACTUM CINCHONÆ CORDIFOLIÆ.

Extract of Yellow (Heart-leaved) Cinchona.

Commentary.—This extract is not to be found in the chemists' shops.

EXTRACTUM CINCHONÆ LANCIFOLIÆ.

Extract of Lance-leaved (Pale) Cinchona.

Extractum Corticis Peruviani, P. L. 1745, P. L. 1788.
Extractum Cinchonæ, P. L. 1788, P. L. 1809, P. L. 1824.

Characters.—Odour, like that of burnt treacle, and slightly of the powdered bark; taste, acid, bitter, and astringent; colour, reddish-black: a solution of 5 grains in an ounce of water strongly affects litmus. I will not say that these ought to be the characters of the extract, but all the soft specimens I have met with in the first houses near me have uniformly presented these qualities. The hard, resinous extract, is free from acidity. Mr. Phillips says, the extract ought to be nearly inodorous, of a dark brown colour, and bitter. Truth compels me to state that I have nowhere found it with these eligible characters.

The foreign extract, such as I have seen, is superior to the English. It has not the treacle odour; it forms a transparent solution in water (which the English does not), and it is not acid.

EXTRACTUM CINCHONÆ OBLONGIFOLIÆ.

Extract of Oblong-leaved (Red) Cinchona.

Commentary.—This is another extract not to be found in the shops.

EXTRACTUM COLCHICI ACETICUM.

Acetic Extract of Colchicum (Meadow Saffron).

Characters.—Colour, light brown; odour, of acetic acid.

EXTRACTUM COLOCYNTHIDIS.

Extract of Colocynth.

Extractum Colocynthidis, P. L. 1809, P. L. 1824.

Characters.—Colour, light opaque brown; almost inodorous.

Commentary.—Colocyntine, according to M. Vauquelin, is the resinoid active principle of the bitter apple. It is readily soluble in alcohol; sparingly so in water; readily soluble in acids and alkalies; intensely bitter, and highly drastic as a purge.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM.

Compound Extract of Colocynth.

Extractum Catharticum, P. L. 1745.
Extractum Colocynthidis compositum, P. L. 1788 to P. L. 1824.

Characters,—Colour, dark as liquorice-extract; odour, of the cardamoms; taste, bitter and aromatic.

EXTRACTUM ELATERII.

Extract of Elaterium or Wild Cucumber.

Elaterium P. L. 1720, P. L. 1745, P. L. 1788.
Extractum Elaterii, P. L. 1809, P. L. 1824.

Characters.—It has a slate-pencil colour; its taste is bitter and acrid. It should be light, easily reduced to powder, and inflammable. Mr. Hennel separated from it, by the action of alcohol, minute colourless crystals, nearly insoluble in water or dilute acids, and sparingly so in æther. The portion undissolved by the alcohol was treated with æther, which dissolved a greenish extract, having all the properties of a resin, and possessing, in a concentrated form, all the medicinal properties of elaterium. A solution of 3½ grains in an ounce of alcohol acted powerfully as a hydragogue.

Elaterium, by analysis, yielded very nearly—

Elatin (green resinous extract)	17
Bitter principle ?	44
Starch	6
Woody fibre	27
Earthy matter	7
	101

In commerce, two distinct kinds of elaterium are commonly met with. The one in irregular, dry, pulverulent fragments, of a dusky green hue; the other in thin hard plates, of a slate-pencil colour, with a slight shade of green. The latter is by far the more potent.

EXTRACTUM GENTIANÆ.

Extract of Gentian.

Extractum Gentianæ, P. L. 1745 to P. L. 1824.

Characters.—Colour, light transparent brown; scarcely any odour; taste, bitter and aromatic, like the root. This ought to be the character; but, as commonly met with, it is black, like liquorice.

EXTRACTUM GLYCYRRHIZÆ.

Extract of Liquorice.

Extractum Glycyrrhizæ, P. L. 1745 to P. L. 1824.

Characters.—Odour, agreeable; colour, jet black; taste, intensely sweet.

EXTRACTUM HÆMATOXYLI.

Extract of Logwood.

Extractum Ligni Campechensis, P. L. 1745, P. L. 1788.
Extractum Hæmatoxyli, P. L. 1788, *ed. altera*, P. L. 1809,
P. L. 1824.

Characters.—Colour, almost black; odour, slightly of liquorice; taste, intensely sweet.

EXTRACTUM LUPULI.

Extract of Hops.

Extractum Humuli, P. L. 1809, P. L. 1824.

Characters.—Colour, dusky light brown; odour, something like that of brown sugar; taste, like that of the bitter of hops unimpaired.

EXTRACTUM PAREIRÆ.

Extract of Pareira.

Characters.—Colour, chocolate brown; odour, of brown sugar; taste, at first sweet, afterwards of a warm bitter.

EXTRACTUM SARSÆ.

Extract of Sarsaparilla.

Extractum Sarsaparillæ, P. L. 1809, P. L. 1824.

Characters.—Colour, intense red, approaching to black; odour and taste, peculiar to sarsaparilla.

Commentary.—Sarsaparilla contains a peculiar proximate principle, which, on the authority of Berzelius and Gmelin, may be described as white, pulverulent, heavier than distilled water; taste, bitter and astringent; and of a peculiar odour. Slightly soluble in warm water and cold alcohol, and entirely so in boiling alcohol. It reddens turmeric, and forms neutral salts with acids.

EXTRACTUM TARAXACI.

Extract of Dandelion.

Extractum Taraxaci, P. L. 1809, P. L. 1824.

Characters.—"This extract (as commonly met with) has a sweet taste, and is readily soluble in water; but Mr. Squire of Oxford-street, who has paid much attention to this and other extracts, informs me that when cautiously prepared it is bitter, and that when sweet the efficacy of the remedy is impaired. When carefully prepared, Extract of Dandelion is of a brown colour, has a sensibly bitter taste, and a peculiar aroma, but it is not sweet." I have taken this extract from Brande's "Manual" at Mr. Squire's suggestion; but he will allow me to add that, with every deference to his judgment, as to one who has paid much attention to extracts (and more satisfactory extracts I have never seen), it requires much observation and practical experience to say how far the remedial effects of an alterative medicine may have been impaired.

EXTRACTUM UVÆ URSI.

Extract of Whortleberry [leaves].

Characters.—Colour, dark olive; odour, faint; and taste, intensely astringent.

EXTRACTUM JALAPÆ.

Extract of Jalap.

Extractum Jalapii, P. L. 1745, P. L. 1788.
Extractum Jalapæ, P. L. 1809, P. L. 1824.

Characters.—Colour, deep brown; slightly odorous; taste, powerful of the root.

Commentary.—Jalap, according to analysis, consists of—

Resin	10
Starch and Albumen	5
Gummy Extract	44
Lignin	28
Salts, Water, and Loss	13
	100

The average produce of the above extract, from a fair sample of the root, is 66 per cent. It was supposed to contain an active principle called Jalapine, one of the many chemical dreams not yet verified.

EXTRACTUM OPII PURIFICATUM.

Purified Extract of Opium.

Opium Colatum, vel Extractum Thebaicum, P. L. 1720, P. L. 1745.
Opium Purificatum, P. L. 1788.
Extractum Opii, P. L. 1809, P. L. 1824.

Characters.—Odour, slight, until warmed; colour, dark brown; taste, bitter.

Commentary.—In the Paris Pharmacopœia a vinous extract is introduced. For those who take liquid laudanum habitually, old opium dissolved in good sherry is the least objectionable form, and by increasing the quantity of the wine, the opium may proportionably be diminished without distressing the most confirmed opium eater, if done very gradually.

EXTRACTUM PAPAVERIS.

Extract of Poppy.

Extractum Papaveris, P. L. 1809, P. L. 1824.

Characters.—Odour, virose, like the poppy, quite different from that of opium; colour, glistening black; taste, slightly bitter, mixed with that of the common extract of liquorice.

EXTRACTUM RHEI.

Extract of Rhubarb.

Extractum Rhei, P. L. 1809, P. L. 1824.

Characters.—Colour, intense yellow, approaching black; odour, very strong of the root; and taste, strongly astringent and aromatic.

EXTRACTUM STRAMONII.

Extract of Stramonium [or Thorn-Apple Seed].

Extractum Stramonii, P. L. 1824.

Characters.—More or less of a grass-green colour; odour, herbaceous; taste, powerfully penetrating, subsaline, aromatic.

General Commentary.—I have with some care compared the quality of extracts as they occur in this metropolis. It would give me much pain to make a single observation hurtful to the feelings, or injurious to the interests, of any individual engaged in the drug trade; but I am bound by a deep sense of duty to say that this class of medicines are the most varying, imperfect, and therefore, to effect a definite remedial indication, the most inadequate, of all contained in the Pharmacopœia. Some, like aconite, are impaired in so short a time, as to scarcely compensate for the trouble of preparing them; but the majority are defective from bad management in the process. Mr. Squire justly observes, that, as a general rule, they should be made by expressing the juice from the recently gathered vegetable as rapidly as possible, by exposing it in thin strata to a current of very dry air. Practical experiments have fully demonstrated the advantage this process possesses over all others at present in use, for it was shewn that 10 grains of common extract thus prepared were more than equal to 20 grains of that prepared *in vacuo*, and more than equal to 60 grains of that prepared by the process of boiling down the juice to an extract. The principal error committed by dispensing chemists, and in a great degree by practitioners, is the purchasing the extracts in too large a quantity. Hence the consumption at the end of a year or two, leaves a surplus, which, at the dictates of economy, is made to answer for years ensuing, and it often becomes a sort of heirloom, from father to son, or from predecessor to successor, to the disappointment of the prescriber, and to the manifest injury of the patient.

INFUSA.

Infusions.

INFUSUM ANTHEMIDIS.

Infusion of Chamomile.

Infusum Anthemidis, P. L. 1809, P. L. 1824.

INFUSUM ARMORACIÆ COMPOSITUM.

Compound Infusion of Horseradish.

Infusum Armoraciæ compositum, P. L. 1809, P. L. 1824.

INFUSUM AURANTII COMPOSITUM.

Compound Infusion of Orange Peel.

Infusum Aurantii compositum, P. L. 1809, P. L. 1824.

INFUSUM CALUMBÆ.

Infusion of Calumba.

Infusum Calumbæ, P. L. 1809, P. L. 1824.

INFUSUM CARYOPHYLLI.

Infusion of Cloves.

Infusum Caryophyllorum, P. L. 1809, P. L. 1824.

INFUSUM CASCARILLÆ.

Infusion of Cascarilla.

Infusum Cascarillæ, P. L. 1809, P. L. 1824.

INFUSUM CATECHU COMPOSITUM.

Compound Infusion of Catechu.

Infusum Catechu, P. L. 1809.
Infusum Catechu compositum, P. L. 1824.

INFUSUM CINCHONÆ [LANCIFOLIÆ].

Infusion of Cinchona.

Infusum Cinchonæ, P. L. 1809, P. L. 1824.

INFUSUM CUSPARIÆ.

Infusion of Cusparia.

Infusum Cuspariæ, P. L. 1809, P. L. 1824.

INFUSUM DIGITALIS.

Infusion of Foxglove.

Infusum Digitalis, P. L. 1809, P. L. 1824.

INFUSUM DIOSMÆ.

Infusion of Buchu.

INFUSUM GENTIANÆ COMPOSITUM.

Compound Infusion of Gentian.

Infusum Amarum simplex, P. L. 1720, P. L. 1745.
Infusum Gentianæ compositum, P. L. 1809, P. L. 1824.

INFUSUM KRAMERIÆ.

Infusion of Rhatany.

INFUSUM LINI COMPOSITUM.

Compound Infusion of Linseed.

Infusum Lini, P. L. 1809.
Infusum Lini compositum, P. L. 1824.

INFUSUM LUPULI.

Infusion of Hops.

INFUSUM PAREIRÆ.

Infusion of Pareira.

INFUSUM QUASSIÆ.

Infusion of Quassia.

Infusum Quassiæ, P. L. 1809. P. L. 1824.

INFUSUM RHEI.

Infusion of Rhubarb.

Infusum Rhei, P. L. 1809, P. L. 1824.

INFUSUM ROSÆ COMPOSITUM.

Compound Infusion of Roses.

INFUSUM SCOPARII.

Infusion of Broom.

INFUSUM SENNÆ COMPOSITUM.

Compound Infusion of Senna.

Infusum Sennæ, P. L. 1720.
Infusum Sennæ commune, P. L. 1745.
Infusum Sennæ simplex, P. L. 1788.
Infusum Sennæ, P. L. 1809.
Infusum Sennæ compositum, P. L. 1824.

INFUSUM SERPENTARIÆ.

Infusion of Serpentary.

INFUSUM SIMARUBÆ.

Infusion of Simaruba.

Infusum Simaroubæ, P. L. 1809, P. L. 1824.

INFUSUM VALERIANÆ.

Infusion of Valerian.

General Commentary.—The disadvantages and objections made to these preparations are chiefly based on the laziness or false economy of dispensers. Infusions cannot be procured at a minute's notice; they will not keep, or ought not to be kept, beyond the day. Every dispenser ought to have his set of infusion pots; and it ought to be a rule that they be emptied and cleaned out every morning. Some might not require it, some would; therefore, as a general rule, it will be found most advantageous to insist upon their being emptied every morning as regularly as the helper takes down the shutters. Let the dispenser have no sundry misgivings of the loss of the treasure thus daily ejected; for the few pence loss he will be amply repaid by the character of his infusions. With regard to the delay in compounding a prescription, there are few cases in which four hours would make much difference. In cases of hæmorrhage, when infusion of roses has been prescribed, the delay of six hours may be inconvenient. In such a case, instead of using the concentrated infusion, which, of all I have seen, is the worst preparation, I would recommend the compounder to use a double quantity of the leaves, or even quadruple, so as to supply the remedy within half an hour. I wish it were in my power to recommend the concentrated infusions; for a well-known proprietor who extensively prepares them has been kind enough to write me a sketch of his plans and views, and doubtless some of them, when they leave his laboratory, are very eligible: but the system is bad; it leads to deterioration—it is an apology for deterioration—it is a premium for idleness. That they have been for some years before the public, and have been extensively used by medical practitioners, is, in my opinion, so much the worse for the public, and so much the worse for patients. It has been suggested to me by the same respectable pharmaceutist, that as the active principle of senna, when dissolved in water, combines rapidly with the oxygen of the atmosphere, forming an insoluble compound, which is entirely devoid of efficiency, and as this injurious change is accelerated by heat, a concentrated preparation obtained by the process of evaporation at a very low temperature, so managed as entirely to exclude the atmospheric air, must be a valuable substitute.

LINIMENTA.

Liniments.

LINIMENTUM ÆRUGINIS.

Liniment of Verdigris

Unguentum Ægyptiacum, P. L. 1720.
Mel Ægyptiacum, P. L. 1745.
Oxymel Æruginis, P. L. 1788.
Linimentum Æruginis, P. L. 1809, P. L. 1824.

Composition.—Verdigris is a diacetate, or, as formerly called, an impure subacetate of copper, a dibasic salt, consisting of—

2	equivalents of Oxide of Copper	40 × 2	= 80
1	——— Acetic Acid		= 51
6	——— Water	9 × 6	= 54
			185

It is prepared by exposing thin plates of copper to the action of acetic acid, or its fumes, either by interposing woollen cloths moistened with this acid, or the husks and stalks of grapes or raisins, in a state of acetous fermentation. The corroded surface is from time to time scraped, and the operation repeated until the plate is destroyed.

LINIMENTUM AMMONIÆ.

Liniment of Ammonia.

Linimentum Ammoniæ Fortius, P.L. 1788, P.L. 1809, P.L. 1824.

LINIMENTUM AMMONIÆ SESQUICARBONATIS.

Liniment of Sesquicarbonate of Ammonia.

Linimentum Volatile, P. L. 1745.
Linimentum Ammoniæ, P. L. 1788.
Linimentum Ammoniæ Carbonatis, P. L. 1809.
Linimentum Ammoniæ Subcarbonatis, P. L. 1824.

LINIMENTUM CAMPHORÆ.

Liniment of Camphor.

Linimentum Camphoræ, P. L. 1809, P. L. 1824.

LINIMENTUM CAMPHORÆ COMPOSITUM.

Compound Liniment of Camphor.

Linimentum Camphoræ compositum, P. L. 1788, P. L. 1809, P. L. 1824.

LINIMENTUM HYDRARGYRI COMPOSITUM.

Compound Liniment of Mercury.

Linimentum Hydrargyri, P. L. 1809.
Linimentum Hydrargyri compositum, P. L. 1824.

LINIMENTUM OPII.

Liniment of Opium.

LINIMENTUM SAPONIS.

Liniment of Soap.

Linimentum Saponaceum, P. L. 1745.
Linimentum Saponis compositum, P. L. 1788, P. L. 1809, P. L. 1824.

LINIMENTUM TEREBINTHINÆ.

Liniment of Turpentine.

MELLITA.

Preparations of Honey.

MEL BORACIS.

Honey of Borax.

Mel Boracis, P. L. 1809, P. L. 1824.

MEL ROSÆ.

Honey of Rose.

Mel Rosarum, P. L. 1720.
Mel Rosaceum, P. L. 1745.
Mel Rosæ, P. L. 1788, P. L. 1809, P. L. 1824.

OXYMEL.

Oxymel.

Oxymel Simplex, P. L. 1720, P. L. 1745.
Mel Acetatum, P. L. 1788.
Oxymel, P. L. 1809.
Oxymel Simplex, P. L. 1824.

OXYMEL SCILLÆ.

Oxymel of Squill.

Oxymel Scilliticum, P. L. 1720, P. L. 1745.
Oxymel Scillæ, P. L. 1788, P. L. 1809, P. L. 1824.

METALLICA.

Metallic Preparations.

PRÆPARATA EX ALUMINIO.

Preparations of Aluminium.

ALUMINIUM, the metallic base of alumina, is in the form of a grey powder, or in small scales or spangles. It requires for its fusion a temperature higher than the fusing point of iron. Heated to redness in the open air, it burns with a vivid light, and yields alumina. It is not oxidized at common temperatures, nor tarnished by water. Sulphuric and nitric acids, even when concentrated, do not affect it at common temperatures; but, by the aid of heat, the former rapidly dissolves it, and sulphurous acid gas is disengaged.

ALUMEN EXSICCATUM.

Dried Alum.

Alumen Ustum, P. L. 1788.
Alumen Exsiccatum, P. L. 1809, P. L. 1824.

Composition of Alum before exsiccation—

3 equivalents of Sulphate of Alumina.. 58 × 3 = 174
1 ——— Sulphate of Potassa .. = 88
25 ——— Water.............. 9 × 25 = 225
Equivalent 487

Alumina consists of—

1 equivalent of Aluminium ... = 10
1 ——— Oxygen...... = 8
Equivalent 18

Properties.—Alum has an astringent, sour taste, tempered by a certain degree of sweetness; it reddens vegetable blues; is soluble in about five times its weight of cold water, and in rather more than its own weight of boiling water, according to Brande; or, according to the college authority, in eighteen times its weight of water at 60°, and in three-fourths of its weight at 212°. At a red heat it loses part of its acid.

Process.—The crystals, when heated, become fused in their own water of crystallization, which is gradually expelled; and if the heat be too much raised, a part of the acid is also dissipated. Alum is usually prepared by roasting and lixiviating alum slate, or certain clays containing pyrites, and adding to the leys a certain quantity of sulphate of potassa, which at the works near Glasgow is obtained by burning common sea-weed, collected upon the coast.

PRÆPARATA EX ANTIMONIO.

Preparations of Antimony.

Antimony, a word derived from anti-moine, signifying antimonk, from the circumstance of some monks having been poisoned by the injudicious use of a preparation of it, is commonly found in the state of sulphuret, although sometimes native. This ore is the *stibium* of the ancients, who regarded it as the metal itself, while the real metal was called by them *regulus* of antimony. It is a brittle metal, of a white colour, verging to a bluish gray, and possessed of considerable lustre. Its sp. gr. is 6·7. It fuses at 810°, and yields crystals on cooling. Unlike that of most other metals, arsenic excepted, its primary form is a rhomboedron. Heated to a full red heat, in a covered crucible, and then suddenly exposed to the air, it inflames, and burns with a white light. The vapour arising from this combustion, if condensed on a cool surface, forms the sesquioxide-crystals, formerly called *argentine flowers of antimony*. Antimony unites with oxygen in three proportions.

1½ eq. of Antimony + 1 eq. of Oxygen = Sesquioxide of Antimony.
1 —— + 2 —— = Antimonious Acid or Deutoxide.
1 —— + 2½ —— = Antimonic Acid or Peroxide.

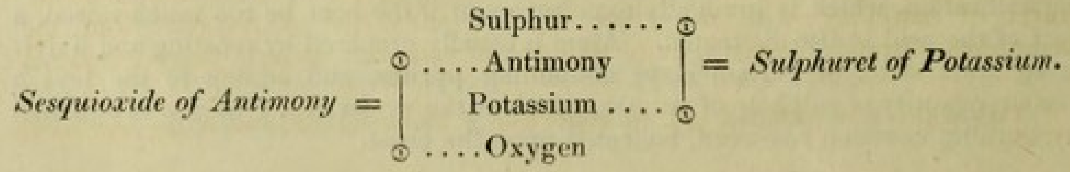
ANTIMONII OXYSULPHURETUM.

Oxysulphuret of Antimony.

Sulphur Antimonii præcipitatum, P. L. 1745, P. L. 1788.
Antimonii Sulphuretum præcipitatum, P. L. 1809, P. L. 1824.

Composition.— This is conjectural, but it is commonly considered to be a combination of sesquioxide of antimony, and sesquisulphuret of antimony with water.

Decomposition.—Sesquisulphuret of antimony, consisting of sulphur and antimony, is boiled in a solution of potassa, which consists of potassium and oxygen. A portion of each exchange elements,—sulphur with potassium, to form sulphuret of potassium, and antimony with oxygen to form sesquioxide of antimony, which remain in solution, mixed with the remaining undecomposed sesquisulphuret of antimony and the potassa.



On adding the dilute sulphuric acid, it saturates the potassa to form sulphate of potassa in solution; and by diminishing the solvent power of the liquor, the oxide of antimony with sulphuret of antimony is precipitated, constituting the oxysulphuret of antimony. The sulphuret of potassium is also disturbed, the potassium is converted into potassa, at the expense of oxygen from the water, while the hydrogen combines with the sulphur to form hydrosulphuric acid (sulphuretted hydrogen) gas, which is expelled.

Properties.—Colour, bright orange; taste, slightly styptic; odour, none. Insoluble in water. Not readily acted upon by the acids. Mr. Phillips found that in boiling it with bitartrate of potassa, the oxysulphuret lost 12 per cent by weight, which is the amount of sesquioxide it contains. Berzelius contends that this oxide is not in a state of chemical union with the sulphuret, but tenaciously adhering to it; and he rightly argues, says Turner, "that the question is not whether oxide of antimony is sometimes or generally present in a kermes, but whether the latter can exist without oxide of antimony." This question he has answered affirmatively and conclusively.

ANTIMONII POTASSIO-TARTRAS.

Potassio-tartrate of Antimony.

Tartarus Emeticus, P. L. 1720.
Tartarum Emeticum, P. L. 1745.[*]
Antimonium Tartarizatum, P. L. 1788, P. L. 1824.

Composition.—1 equivalent of	Tartrate of Potassa ..	66 + 48	=	114
1 ——	Ditartrate of Sesquioxide of Antimony	66 + 154	=	220
3 ——	Water	9 × 3	=	27
				361

The emetic tartar of the last Pharmacopœia was stated by Mr. Brande to consist of—

1 equivalent of Tris-protartrate of Antimony.
1 —— Tartrate of Potassa,
with water of crystallization.

Decomposition.—The chemical exchanges in this process are much more complicated than in those of the formula for emetic tartar, in the last Pharmacopœia. According to the older method, glass of antimony, consisting of 85 parts of protoxide, now called sesquioxide of antimony, and 15 of sulphuret of antimony, were boiled with a solution of bitartrate of potassa; and according to the chemical authorities of that time, one equivalent of tartaric acid was attracted by three of the protoxide, to form a tris-protartrate of the metal, which uniting with the tartrate of potassa, was said to form a double salt, while the sulphuret was detached. This will serve as an introduction to explain the present process. The first object is to oxydize the metal. On mixing and igniting the sesquisulphuret of antimony with the nitre, three equivalents of oxygen from the decomposed nitrate of potassa, unite with two of antimony, to form two equivalents

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[*] This edition was published in 1746, which date it bears, but the date of the *imprimatur* is 1745.

of sesquioxide of antimony, or 1½ equivalent with 1 equivalent. So also the sulphur of the sesquisulphuret attracts oxygen from the decomposed nitric acid, to form sulphuric acid, which in its turn attaches itself to the potassa-base to form a sulphate of potassa, and various gases are evolved. The only use of the hydrochloric acid is to detach any free potassa, and to prevent the formation of sulphuret of potassium. The residue is freed from the sulphate of potassa and chloride of potassium by washing with boiling water, until it is free from taste.

Product.—Sesquioxide of antimony with some sulphuret of antimony.

This is boiled with the bitartrate of potassa, containing, as above said, two equivalents of tartaric acid, and one equivalent of potassa. One equivalent of the acid unites with two equivalents of the sesquioxide, to form a ditartrate of antimony; which combining with the tartrate of potassa, forms a salt which has been considered by some a double, by others a triple compound, and is now called potassio-tartrate of Antimony.

Properties.—Crystals, octoëdral; white; slightly efflorescent; having a styptic taste, in which that of the cream of tartar is not altogether lost. Soluble in 14 parts of cold, and 2 of boiling water. Solution decomposed by keeping, and by the addition of undistilled water.

Commentary.—The common practice of dissolving this active compound in impure water, is highly injudicious. Two ounces of hard water will decompose a considerable dose of emetic tartar, and thus it has happened that nearly a whole bottle full of such solution has been consumed without inducing vomiting. This in some cases, as in cynanche trachealis, might be a very serious disadvantage, especially in a country practice at some distance from a further supply: for in croup, as in some other diseases, the mucous secretion clothing and adhering to the inner surface of the stomach, renders it no easy matter to induce vomiting by any moderate doses.

VINUM ANTIMONII POTASSIO-TARTRATIS.

Wine of Potassio-tartrate of Antimony.

Vinum Antimonii Tartarizati, P. L. 1788.
Liquor Antimonii Tartarizati, P. L. 1809, P. L. 1824.

PULVIS ANTIMONII COMPOSITUS.

Compound Powder of Antimony.

Pulvis Antimonialis, P. L. 1788, P. L. 1809, P. L. 1824.

Composition.—1 equivalent of Oxide of Antimony or
Antimonious Acid, consisting of 16 oxy. + 66 ant. = 82
mixed with Phosphate of Lime.

Twenty years ago I stated my belief of this being nothing more than a mechanical mixture of the oxide with phosphate of lime, in page 56 of my Pharmacopœia.

Decomposition.—Sesquisulphuret of antimony, consisting of sulphur and antimony, is heated with hartshorn shavings, consisting of phosphate of lime and animal matter. The sulphur and gelatine are dissipated, and the antimony attracting oxygen from the air, remains in the crucible in the state of antimonious acid, mixed with the unchanged phosphate of lime.

Commentary.—James's powder, which has long had a considerable share of the public confidence, consists of—

Antimonious Acid	56
Phosphate of Lime	44
	100

Thus the high state of oxidizement of both these preparations, the antimonial powder and the James's, render them comparatively inactive. It is not however correct, that all the antimonial powder is similarly constituted: Mr. Brande tells us that he found specimens containing various proportions of the sesquioxide and the antimonious acid. Probably the best mode of preparing a substitute, would be by intimately mixing either sesquioxide of antimony or emetic tartar in certain proportions with the cornu ustum; and, if not with this design, it would be difficult to say why the last mentioned preparation maintains its place in the present Pharmacopœia. If, after the exposure of the chemical constitution of these antimonials, practitioners persist in using either the pulvis antimonialis, or the pulvis Jacobi, they ought certainly to be satisfied that these preparations contain the sesquioxide. One drachm of sesquioxide of antimony, or half a drachm of emetic tartar, rubbed with one ounce of finely powdered burnt horn, and intimately mixed, would form a better preparation than either of the above; and such a mixture would be more satisfactory, because no longer uncertain both in constitution and effect. The sesquioxide of antimony was directed (P.L. 1809) to be precipitated from a solution of emetic tartar by the addition of subcarbonate of ammonia. It may also be obtained by adding a sesquichloride of antimony, prepared by boiling the native sulphuret in hydrochloric acid, to distilled water. Sesquioxide of antimony and some undecomposed chloride are precipitated; which latter compound may be decomposed by the addition of carbonate of potassa, and the process of elutriation. The pure sesquioxide is the residue. It may still more simply be procured by precipitation, by means of a soda or potassa-carbonate.

Properties of the Sesquioxide of Antimony.—A dusky white powder, sp. gr. 5·666. By heat it assumes a yellow appearance. It fuses at a red heat in close vessels into a yellow fluid, which as it cools becomes a grey crystalline mass. Sublimed in contact with the atmosphere, it absorbs oxygen, and forms antimonious acid, but if the air be excluded, it sublimes unchanged.

PRÆPARATA EX ARGENTO.

Preparations of Silver.

Silver is one of the seven metals well known to the ancients. It not unfrequently occurs native, both massive and in crystals; it is also found alloyed with gold, tellurium, antimony, copper, arsenic, and sulphur. The lead ore of our own British mines (galena) is rarely free from traces of silver; and in former times silver has been obtained from this source, and from alloys with copper ore. It is the most perfectly clear white of all the metals. Pure sulphuric or nitric acid acts upon and dissolves it, forming a sulphate or a nitrate of silver; but the former acid requires the aid of heat. It combines with oxygen in one definite proportion only, namely, 1 equivalent of silver, 108 + 1 equivalent of oxygen, 8 = 116. Silver is precipitated in the metallic state by most other metals. When mercury is employed for this purpose, the silver assumes an arborescent appearance, called *Arbor Dianæ*.

ARGENTI CYANIDUM.

Cyanide of Silver.

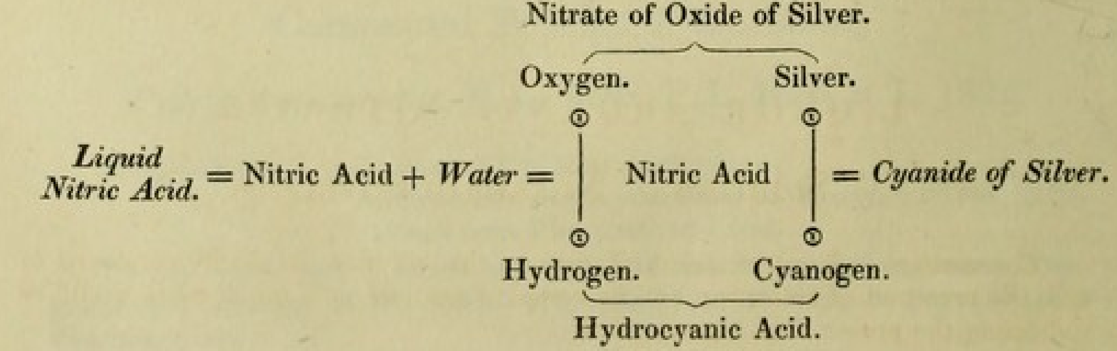
(Otherwise called Cyanuret of Silver.)

Composition.—1 equivalent of Silver........ = 108 or 80·6
1 ——— Cyanogen .... = 26 19·4
134 100

Cyanogen is itself composed of—

2 equivalents of Carbon, 12 + 1 equivalent of Azote, 14 = equivalent 26.

Decomposition.—On adding hydrocyanic acid to a solution of nitrate of silver, the cyanogen unites with the silver to form the cyanide as above; while the oxygen from the silver unites with the hydrogen to form water.



Properties.—Cyanide of silver, as above prepared, is a white precipitate, which, when heated, fuses, and at a high temperature gives out cyanogen. It is insoluble in water, but readily soluble in liquor of ammonia. It is readily decomposed by hydrochloric and by hydrosulphuric acids, as well as by the salts of this last acid. Concentrated sulphuric and nitric acids when heated dissolve it; but these acids, when of ordinary strength and at common temperatures, exert scarcely any action upon it.

Commentary.—It is used for the extemporaneous preparation of hydrocyanic acid.

ARGENTI NITRAS.

Nitrate of Silver.

Causticum Lunare, P. L. 1720, P. L. 1745.
Argentum Nitratum, P. L. 1788.
Argenti Nitras, P. L. 1809, P. L. 1824.

Composition.—1 equivalent of Nitric Acid .... = 54
1 ——— Oxide of Silver .... = 116
Equivalent........ 170

Decomposition.—The silver decomposes a part of the nitric acid, forming an oxide of silver, and binoxide of azote is evolved. The oxide combining with the remaining undecomposed nitric acid, forms a nitrate of silver, composed of—

1 equivalent of Nitric Acid .... = 54 or 31·76
1 ——— Oxide of Silver........ = 116 68·24
170 100

"When oxidation is effected through the medium of nitric acid, the acid itself is commonly converted into binoxide of nitrogen. This gas is sometimes given off nearly pure; but in general some nitrous acid, protoxide of nitrogen or pure nitrogen, is disengaged at the same time."—Turner.

Properties.—It should be colourless and transparent. It does not deliquesce on exposure to the atmosphere. If dark and opaque, and imperfectly soluble in distilled water, it has suffered partial decomposition during fusion. It is soluble in an equal weight of cold water, and in half its weight of hot water. It dissolves also in four times its weight of alcohol. The black stain produced when it has been in contact with paper, and the white surface produced on sores, is owing to the reduction of the oxide. It is an extremely delicate test of the presence of organic matter.

LIQUOR ARGENTI NITRATIS.

Solution of Nitrate of Silver.

Commentary.—In pharmaceutical process this solution is chiefly employed to test the presence of chlorine; but in complex analyses it is much more useful as indicating the presence of organic matter.

PRÆPARATUM EX ARSENICO.

Preparation of Arsenic.

Properties of Arsenic.—Metallic arsenic is of a steel grey colour ; very brittle; crystalline in its texture, and possessing, when fresh broken, considerable lustre. Its sp. gr. is 5·8. It readily volatilizes, and sublimes in close vessels at 360°. Its equivalent is 38, according to Thomson ; 37·7 according to Turner. It unites with oxygen in two definite proportions, forming the super-oxidized oxides of the old school, now more properly called arsenious, and arsenic acids, from their property of combining with other metallic oxide bases.

LIQUOR POTASSÆ ARSENITIS.

Solution of Arsenite of Potassa.

Liquor Arsenicalis, P. L. 1809, P. L. 1824.

(Fowler's Solution.)

Composition.—It contains 1 grain of arsenious acid in 2 fluidrachms of the solution, united with 1 equivalent of potassa.

Decomposition.—The arsenious acid unites with the potassa to form an arsenite of potassa, while the carbonic acid is expelled. Simple elective affinity. A withdraws B from its combination with C, because a greater affinity exists under ordinary circumstances between A and B than between B and C.

Arsenious Acid is composed of—

$$\begin{array}{lrrr} 1 \text{ equivalent of Arsenic} & = & 38 & \text{or } 74{\cdot}24 \\ 1\tfrac{1}{2} \text{ —— Oxygen} & = & \underline{12} & \underline{25{\cdot}76} \\ & & 50 & 100 \end{array}$$

Arsenic Acid is composed of—

$$\begin{array}{lrr} 1 \text{ equivalent of Arsenic} & = & 38 \\ 2\tfrac{1}{2} \text{ —— Oxygen} & = & \underline{20} \\ & & 58 \end{array}$$

Properties of Arsenious Acid, or White Arsenic, or Oxide of Arsenic.—The white arsenic of commerce is chiefly an article of import ; and, as commonly met with, it consists of white, semi-transparent, brittle masses, partly opaque, and partly vitreous when fractured. Its sp. gr. is 3·72, varying with the greater or less proportion of the transparent part, which is the heaviest: it becomes more opaque by keeping. It is well known to be virulently poisonous; producing inflammation of the stomach and bowels, and more frequently destroying by the exhaustion it occasions before gangrene. It has no smell when perfectly free from metallic arsenic. It is erroneously described by chemists as completely tasteless; but although scarcely tasted in small quantities, and rapidly removed from the tongue, patients who have recovered after taking considerable portions of it, continue to taste it intensely until it is entirely ejected, and for days afterwards. It is volatile at 380°, and does not, as has been said, give out garlick fumes, unless a minute portion of metallic arsenic be present, or unless a portion of the white arsenic be reduced by coming in contact with carbonaceous matter. According to Klaproth, 1000 parts of boiling water dissolve 77·75 of arsenious acid, and the solution deposits 47·75 after having cooled down to 60°; but the same quantity of water at 60° when mixed with the acid in powder, only dissolves two parts and a half.

PRÆPARATA È BARIO.

Preparations of Barium.

Properties of Metallic Barium.—Davy discovered this metal in 1808. It is of a dark grey colour, and has a sp. gr. of about 2. It rapidly absorbs oxygen; and under a gentle heat it burns with a red light, forming baryta. It decomposes water with the evolution of hydrogen, and baryta is left in solution. Its equivalent is 69.

Baryta, or Oxide of Barium, is also of a slightly grey colour, very difficult of fusion; inodorous; taste, strongly alkaline; greens vegetable blues; soluble in water, insoluble in alcohol.

It consists of—

				Davy.
1 equivalent of Barium	=	68 or	69	89·7
1 ——— Oxygen	=	8	8	10·3
Equivalent....		76 or	77	100

It has a name assigned to it, expressive of its having been considered as the heaviest of the earths.

Carbonate of Baryta.—It more usually occurs in irregular masses. Its primitive crystal is an obtuse rhomboid; but sometimes it forms pyramidal six-sided prisms. It is very sparingly soluble either in hot or cold water, but nevertheless highly poisonous. It is colourless, and has no action on vegetable colours. It is very sparingly soluble in a solution of carbonic acid. It is commonly used as the source of pure baryta and its salts: hence it is selected for the preparation of chloride of barium.

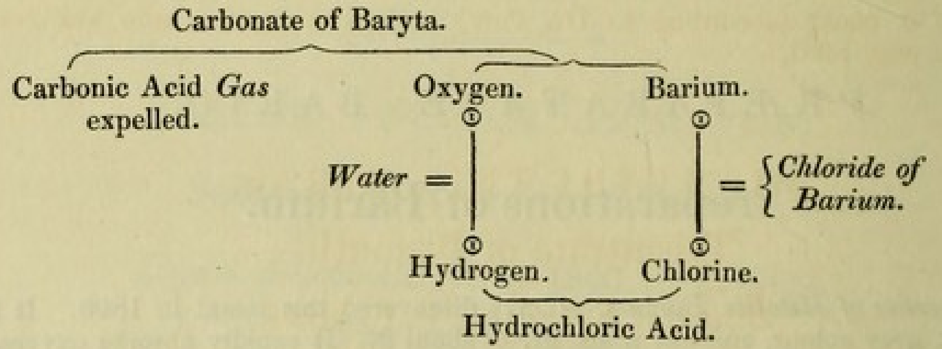
BARII CHLORIDUM.

Chloride of Barium.

Composition of Chloride of Barium.—It consists of—

1 equivalent of Chlorine...... = 36
1 ——— Barium ...... = 68
104

Decomposition.—When the diluted hydrochloric acid is mixed with the carbonate of baryta, and heat is employed, the carbonic acid is expelled. Water is formed by the union of the oxygen of the baryta with the hydrogen of the hydrochloric acid; while the chlorine uniting with the barium forms a chloride of barium in solution, which is afterwards crystallized.



Products.—Carbonic Acid *Gas.*
Water.
Chloride of Barium.

Properties.—The crystals of chloride of barium consist of 104·12 parts of chloride of barium and 18 parts of water. They are not affected by exposure to the atmosphere in its ordinary condition; but in a very dry atmosphere at 60° they lose their water, which they afterwards recover by exposure to a moist air: 100 parts of water at 60° dissolve 43½ parts of these crystals, and 78 parts at 222°, which is the boiling point of this solution. They are insoluble in alcohol.

LIQUOR BARII CHLORIDI.

Solution of Chloride of Barium.

Commentary.—This solution is extensively employed as a test of the presence of sulphuric acid, or its compounds.

PRÆPARATUM È BISMUTHO.

Preparation of Bismuth.

Bismuth was first described by Agricola in 1529. It occurs both native and combined with sulphur, oxygen, arsenic, and other substances. It is most commonly obtained from the impure native bismuth. Its colour is reddish-white, and it possesses considerable brilliancy. Its sp. gr. is 10. It may be hammered into plates when warm, although brittle when cold. It melts at 476°. Its equivalent number is 72; and it unites in two proportions with oxygen, 72 + 8 oxygen, the protoxide; and 72 + 12 the peroxide. The last does not form salts with acids. Although Agricola first described this metal under the name of *plumbum cinereum*, traces of it occur (according to Dr. Parr) in Basil Valentine, who was born about the year 1400.

BISMUTHI TRISNITRAS.

Trisnitrate of Bismuth.

Bismuthi Subnitras, P. L. 1824.

Composition.—

4 equivalents of Oxide of Bismuth .. 80 × 4 = 320
1 ——— Nitric Acid ...... = 54
2 ——— of Water .... 9 × 2 = 18
Equivalent....392 according to Brande.

Or, according to the College authority, it consists of—

3 equivalents of Oxide of Bismuth .. 80 × 3 = 240 or 18·36
1 ——— Nitric Acid ...... = 54 81·64
294 100

Decomposition.—As in the preparing of nitrate of silver, so in this preparation, the metal decomposes part of the nitric acid. 3 equivalents of oxygen unite respectively with 3 of the bismuth to form 3 equivalents of oxide of bismuth; and nitric oxide gas being evolved is converted into the orange-coloured sour nitrous acid gas, by attracting oxygen from the air. The oxide of silver unites with the remaining nitric acid to form a nitrate of silver in solution. On adding the water it attracts the greater part of the nitric acid, and precipitates the trisnitrate composed as above.

Properties.—Trisnitrate (often called subnitrate) of bismuth, otherwise called magistery of bismuth, *pearl white*, or *blanc de fard*, is a white, inodorous, and insipid powder; insoluble in water, and blackened by contact with hydrosulphurous acid. From its whiteness it is sometimes (but inconveniently) employed for improving the complexion.

PRÆPARATA È CALCIO.

Preparations of Calcium.

Properties of Calcium.—Calcium, the metallic base of lime, was also discovered by Davy. It is whiter than barium or strontium, and is converted into lime by being oxidized. Nothing more is at present known concerning its properties.

CALX.

Lime.

Calx Viva, P. L. 1720.
Calx, P. L. 1809, P. L. 1824.

Composition of Lime.—Chalk is one variety of carbonate of lime consisting of—

1 equivalent of Lime .... = 28
1 ——— Carbonic Acid .... = 22
50

Calx or lime is an oxide of calcium consisting of—

1 equivalent of Oxygen .... = 8
1 ——— Calcium .... = 20
28 or with Turner and Gmelin 20·5.

Decomposition.—The carbonic acid and moisture are expelled by heat.

Properties.—Lime is whitish, with a slightly grey tint; moderately hard, but pulverizable. It has an acrid caustic taste; corrodes animal substance; greens vegetable blues; and, although itself very difficult of fusion, it is a powerful flux in the process of smelting metals. Exposed to air it becomes slaked by absorbing water, and is slowly converted into a carbonate.

Commentary.—Free exposure to the atmosphere is indispensable to the expulsion of the carbonic acid. Bucholz found that upon strongly heating chalk closely pressed in a crucible, the access of air and watery vapour being excluded, scarcely any carbonic acid was driven off. So again, Sir J. Hall succeeded in fusing chalk without escape of carbonic acid, thereby imitating the supposed natural process of fusion in the formation of marble. Lime-burners ought to notice this fact.

LIQUOR CALCIS. (HYDRATIS?)

Liquor of Lime. (Hydrate of?)

Aqua Calcis, P. L. 1720.
Aqua Calcis simplex, P. L. 1745.
Aqua Calcis, P. L. 1788.
Liquor Calcis, P. L. 1809.

Hydrate of lime, or slaked lime, consists of solidified water with lime. Its formation is attended with the evolution of much heat, and a bulky powder is left consisting of—

1 equivalent of Lime .... = 28
1 ——— Water........... = 9
Equivalent...... 37

Properties.—This solution should be perfectly transparent, free from colour and smell, and of a styptic alkaline taste. Like lime it has an alkaline reaction on colours, turning vegetable blues green, and yellows to brown. The old liniment for burns formerly, and still sometimes used in the coal-mine districts, is a saponaceous compound of linseed oil and lime-water. Exposed to the air, lime-water absorbs carbonic acid, and no longer strikes a black precipitate with calomel; and, indeed, some surgeons prefer the calomel wash with simple distilled water.

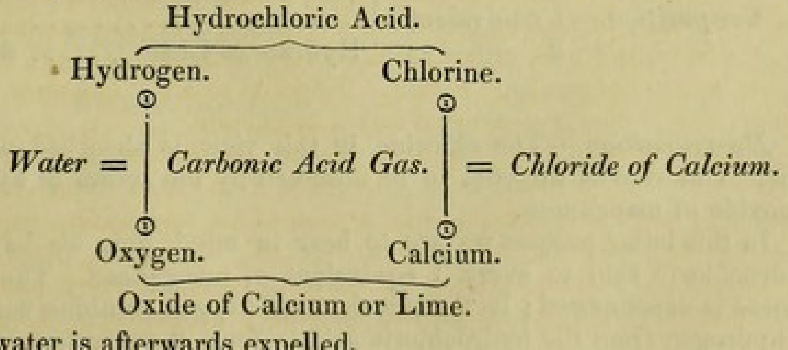
CALCII CHLORIDUM.

Chloride of Calcium.

Calcis Murias, P. L. 1824.

Composition.—1 equivalent of Calcium .... = 20
1 ——— Chlorine .... = 36
56

Decomposition.—On adding chalk to diluted hydrochloric acid the carbonic acid is expelled, and the acid and the lime exchange elements; *i. e.* calcium with the chlorine, and the hydrogen with the oxygen.



The whole of the water is afterwards expelled.

L

Properties.—It is translucent, colourless, bitter and acrid; it has a strong attraction for water, and therefore deliquesces, forming what used to be termed oil of lime. At 60° one part of water dissolves four parts of the chloride. Its solubility is augmented by increase of temperature. It is copiously soluble in alcohol, with evolution of caloric.

Commentary.—It is abundantly produced in the manufacture of carbonate of ammonia, as prepared in the chemical factories in the neighbourhood of town, by the decomposition of muriate of ammonia by chalk or lime. Owing to its strong affinity for water, it is commonly used with snow to form a powerful freezing mixture.

LIQUOR CALCII CHLORIDI.

Solution of Chloride of Calcium.

Liquor Calcis Muriatis, P. L. 1809; editio emendata, P. L. 1824.

The proportions formerly used in the preparation of liquor calcis muriatis were two ounces of the salt to three of water. The proportions, it will be seen, are now four to twelve, to prevent crystallization in cold weather; an inconvenience which, in its former concentrated form, was not uncommon.

CALX CHLORINATA.

Chlorinated Lime.

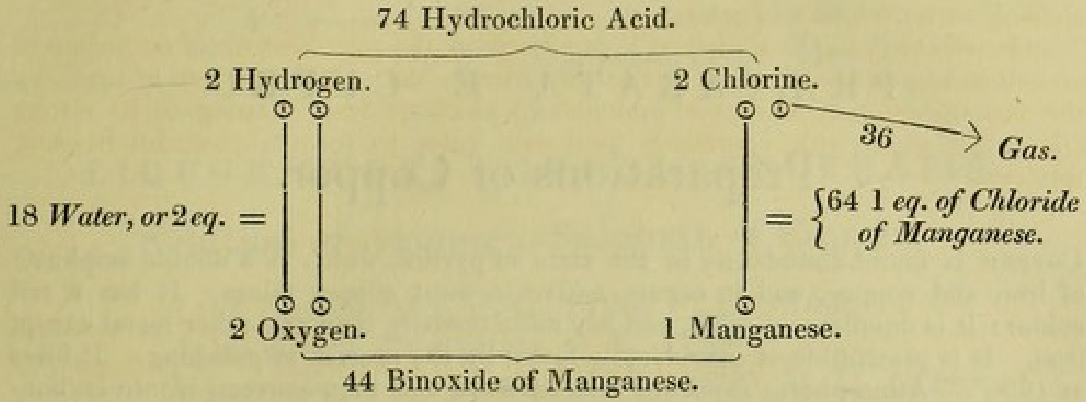
(Commonly called Chloride of Lime.)

(Also called Oxymuriate of Lime and Bleaching Powder.)

Composition.—1 equivalent of Chlorine.............. = 36
2 ——— Hydrate of Lime ...... 37 × 2 = 74
110

Decomposition.—The chlorine, in this view, is absorbed, and unites with the lime. Chlorine is directed to be obtained by the action of hydrochloric acid on binoxide of manganese.

In this latter process we are to bear in mind, that we have 2 equivalents of hydrochloric acid to every 1 equivalent of manganese. The binoxide of manganese is decomposed; its 2 equivalents of oxygen combine with the 2 equivalents of hydrogen from the hydrochloric acid to form 2 equivalents of water, while one of the equivalents of chlorine unites with the one equivalent of manganese to form chloride of manganese, and the other equivalent of chlorine is evolved in the gaseous state, and passed to the lime as above.



Properties.—Chlorinated lime, or chloride of lime, is a dry white powder, faintly smelling like chlorine, and having a strong taste. It is partly soluble in water, to which it imparts its bleaching properties. The solution is found to contain chlorine and lime, but the hydrate is not taken up by the water. When the chlorinated lime or its solution is exposed to the air, chlorine is set free, and carbonate of lime is generated.

Commentary.—It is used as a disinfectant, on the supposition that the hydrogen of the matter of infection is attracted by the chlorine, reasoning from its analogous effects upon putrid effluvia arising from dead animal matter; but the chemical constitution of human infecting effluvia, as of malaria, is as yet mere matter of conjecture.

CRETA PRÆPARATA.

Prepared Chalk.

Creta, P. L. 1720.

Composition.—A variety of Carbonate of Lime—

Carbonic Acid	43
Lime	56·5
Water	·5
	100

PRÆPARATA È CUPRO.

Preparations of Copper.

Copper is found abundantly in the state of pyrites, which is a double sulphuret of iron and copper, and it occurs native in most copper mines. It has a red colour: it is ductile, malleable, and has more tenacity than any other metal except iron. It is susceptible of considerable lustre by the process of polishing. It fuses at 1996°. Atmospheric exposure first oxidizes, and then converts it into carbonate of the black oxide. The vegetable acids do not act upon it if air be excluded; hydrochloric and sulphuric, with difficulty; but nitric acid readily and violently dissolves, and forms it into a nitrate of the black oxide.

CUPRI AMMONIO-SULPHAS.

Ammonio-Sulphate of Copper.

Cuprum Ammoniatum, P. L. 1809, P. L. 1824.

Composition.—In order to arrive at a knowledge of the composition of the above preparation, it will be as well to premise that copper forms two definite compounds with oxygen:

$$\text{Copper 2 equivalents } 64 + \text{Oxygen, 1 equivalent } 8 = \begin{cases} \text{72 Dinoxide of Copper,} \\ \text{not salifiable with acids.} \end{cases}$$

$$\text{Copper 1 ——— } 32 + \text{Oxygen, 1 ——— } 8 = \begin{cases} \text{40 Black Oxide of Copper,} \\ \text{salifiable with acids.} \end{cases}$$

The ammonio-sulphate of copper consists of a mixture of sulphate of ammonia and carbonate of copper.

Decomposition.—On triturating two equivalents of sulphate of copper with two equivalents of sesquicarbonate of ammonia, the alkali attracts the sulphuric acid, and forms a sulphate of ammonia, and the oxide of copper unites with one portion of the carbonic acid, while the other portion is expelled.

Properties.—Ammonio-sulphate of copper is of a fine azure blue colour, which deteriorates by exposure to the air; it partakes of the styptic taste of the other cupreous salts.

Commentary.—It will be seen that there is no formula for the preparing of sulphate of copper, the sulphate of commerce being considered sufficiently pure for all pharmaceutical purposes. It was formerly called blue vitriol; sulphate of zinc was in like manner called white vitriol; and sulphate of iron was named green vitriol. So, again, they were respectively called blue, white, and green copperas, and are still bought under those names for many purposes in the arts. Sulphate of copper is formed directly by dissolving the black oxide (peroxide) of copper in dilute sulphuric acid; but, on a large scale, it is prepared by roasting sulphuret of copper (*copper pyrites*), exposed to air and moisture, by which the metal is oxidized, and the sulphur being converted into sulphuric acid, unites with the oxide to form the sulphate. It consists, in the crystalline state, of—

1 equivalent of Oxide of Copper...... = 40
1 ——— Sulphuric Acid ...... = 40
4 ——— Water .... 9×4 = 36
Equivalent...... 116

LIQUOR CUPRI AMMONIO-SULPHATIS.

Solution of Ammonio-Sulphate of Copper.

Aqua Sappharina, P. L. 1720, P. L. 1745.
Aqua Cupri Ammoniati, P. L. 1788.
Liquor Cupri Ammoniati, P. L. 1809, P. L. 1824.

Commentary.—When exposed to the air, ammonia is given off, and the solution is gradually decomposed with precipitation of the oxide of copper. The presence of excess of the sesquicarbonate of ammonia, is said to prevent this change. The aqueous solution largely diluted deposits trisulphate of copper.

PRÆPARATA È FERRO.

Preparations of Iron.

Iron is most commonly found in combination with sulphur, or with oxygen, in a vast variety of mineral substances, and more sparingly in the animal and vegetable kingdoms. The red oxides of iron are included by mineralogists, under the head of red hæmatite, and the black oxide is called magnetic iron ore. Our own clay iron ore contains a carbonate of protoxide of iron, mixed with silicious, aluminous, and other foreign substances. Iron unites with oxygen in two definite and certain proportions, forming the protoxide and sesquioxide. The magnetic oxide is a compound of the two.

FERRI AMMONIO-CHLORIDUM.

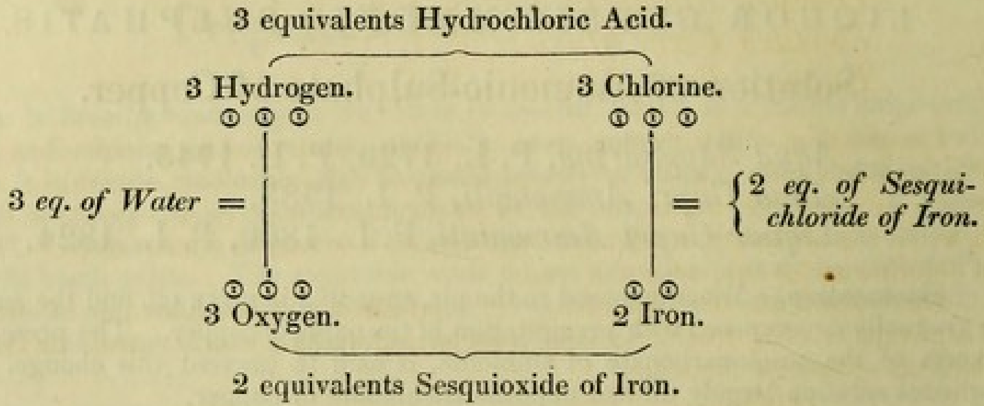
Ammonio-Chloride of Iron.

Ens Veneris, P. L. 1720.
Flores Martiales. P. L. 1745.
Ferrum Ammoniacale, P. L. 1788.
Ferrum Ammoniatum, P. L. 1809, P. L. 1824.

Composition.—It is a mixture of 15 parts of sesquichloride of iron, with 85 of hydrochlorate of ammonia.

Decomposition.—The student will find it more convenient, first to learn the theory of the formation of sulphate of iron, as an introduction to any or all of the other ferruginous compounds. I shall proceed, on the presumption that he already knows the nature of the oxides of iron, and their combining proportions (*Vide* Ferri Sulphas). In making the ammonio-chloride, the sesquioxide of iron is first digested with the hydrochloric acid, in a sand bath.

By a double exchange of constituents the resulting compounds will be sesquichloride of iron and water.



The resulting compound (sesquichloride of iron) is then mixed with the hydrochlorate of ammonia, forming a mixed body, which is not recognised as a definite compound.

Properties.—Colour, ruby or orange red; it becomes moist by exposure to the air; soluble in water, and partially in alcohol. Composition variable, according to the quantity of ingredients employed; not a definite salt, but, to all appearances, a mixture only of the sesquichloride of iron and hydrochlorate of ammonia. It is the ammonio-muriate of iron of many writers.

TINCTURA FERRI AMMONIO-CHLORIDI.

Tincture of Ammonio-Chloride of Iron.

Tinctura Martis, P. L. 1720.
Tinctura Florum Martialium, P. L. 1745.
Tinctura Ferri Ammoniacalis, P. L. 1788.
Tinctura Ferri Ammoniati, P. L. 1809, P. L. 1824.

Commentary.—This preparation contains 1600 grains of hydrochlorate of ammonia, to the 20 fluidounces, or 80 grains to the fluidounces. One fluidrachm, the medium dose assigned by the College, will contain nearly eight grains of the hydrochlorate and 1½ grain of the sesquichloride. It is, in fact, a very different preparation from the tinctura ferri sesquichloridi, as any one who knows the powerful action of sal-ammoniac internally would at once infer.

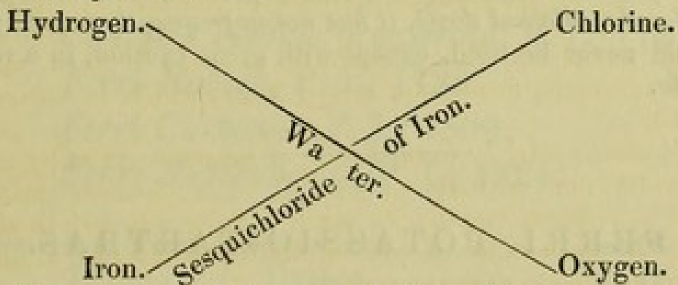
TINCTURA FERRI SESQUICHLORIDI.

Tincture of Sesquichloride of Iron.

Tinctura Martis cum Spiritu Salis, P. L. 1820.
Tinctura Martis in Spiritu Salis, P. L. 1745.
Tinctura Ferri Muriati, P. L. 1788.
Tinctura Ferri Muriatis, P. L. 1809, P. L. 1824.

Composition.—This tincture is an alcoholic solution of sesquichloride of Iron. The sesquichloride consists of $1\frac{1}{2}$ equivalent of chlorine $54 + 1$ equivalent of iron $28 =$ equivalent 82; but in the systems of chemistry it is called a perchloride; and to avoid the absurdity of talking of half-atoms, it is said to consist of 3 equivalents of chlorine and 2 equivalents of iron.

Decomposition.—On dissolving 2 equivalents of sesquioxide of iron in 3 equivalents of hydrochloric acid, a reciprocal exchange takes place in the four elements of these compounds.



Products.—2 equivalents of sesquichloride of iron, and 3 equivalents of water. The tincture contains some excess of hydrochloric acid, which prevents precipitation.

Properties.—Colour, brownish red; smell, æthereal; taste, styptic. Sp. gr. 0·992:—One fluidrachm contains $3\frac{3}{4}$ grains of the sesquichloride of iron.

FERRI IODIDUM.

Iodide of Iron. (Protiodide of Iron.)

Composition.—1 equivalent of Iodine .... = 126
1 ——— Iron .... = 28
5 ——— Water.......... 9×5 = 45
Equivalents 199

It is a direct composition of single equivalents of iodine and iron.

Properties.—Before evaporation the solution is a pale green; yielding, if the water be evaporated out of contact with air, green tabular crystals. These by furthur exposure to heat are fused, and leave a deliquescent residue of an iron-grey colour and metallic lustre. This dry residue is soluble in water and alcohol, but such solution is soon decomposed, unless metallic iron be present; and therefore some pieces of clean iron wire are usually immersed, to prevent the formation of peroxide of iron. At page 147 of my "Pharmacopœia," in the caution column it has been observed, that its solution deposits sesquioxide of iron unless an iron wire is kept constantly immersed in it. Further experience, however, has proved, that although the wire is made to traverse the whole column of the solution, some deposit will take place; but it is nevertheless by this means kept in a neutral state, and the best test of its neutrality is, that it ought to pass through the filter colourless as water.—Squire, "Philosoph. Magazine" for July 1836, page 79.

Properties of Iodine.—Iodine was discovered by M. Courtois, of Paris, in 1812. It exists, combined with potassium or sodium, in many springs; also in marine molluscous animals, and probably in all sea water; although that of the Mediterranean is commonly quoted as the source of it. Moreover, it has been found in fossil productions: Vauquelin found it in an ore of silver. Its colour is blue-black; its lustre, metallic; its odour is allied to that of diluted chlorine; its taste is acrid. It is extremely volatile, rising in violet-coloured vapour at from 60° to 80°. Its most strikingly characteristic property is that of giving a blue colour, with a solution of starch. 100 cubic inches of the vapour weigh 264·75 grains: its sp. gr., compared with air, is 8·7, and compared with hydrogen, 125. At 120° to 130° it rises still more rapidly. It fuses at 220° and boils rapidly at 350°. It changes most vegetable colours yellow; very sparingly soluble in water, which holds in solution not more than $\frac{1}{7000}$ of its weight. It is readily soluble in alcohol and æther. It combines with metals, and forms, with oxygen, iodic, and with hydrogen, hydriodic acid. *It is a deadly poison; and even if given in what have been considered medicinal doses, it has not unfrequently proved fatal in weakly habits,* and should never be used, except with great caution, in a reduced state of the powers of life.

FERRI POTASSIO-TARTRAS.

Potassio-Tartrate of Iron.

Ferrum Tartarizatum, P. L. 1788, P. L. 1809, P. L. 1824.

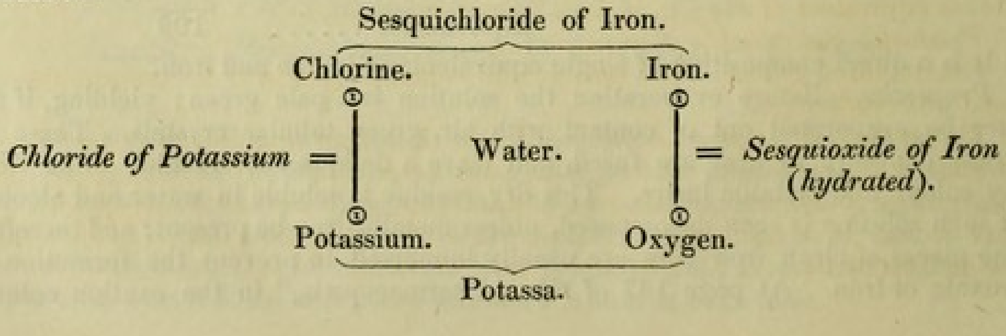
Composition.—

1 equivalent of Tartrate of Potassa..........	=	144	or	51·82
1 ——— Tartrate of Sesquioxide of Iron	=	106		48·18
Equivalent....	=	250		100

Decomposition.—In the first place, sesquioxide of iron is digested in a sand-bath, with hydrochloric acid; and the usual reciprocal exchange, already explained twice by diagrams, is the result.

Products.—1 equivalent of sesquichloride of iron, and 1 equivalent of water.

Secondly, on the addition of the solution of potassa a second double exchange occurs:—



It will be seen that the chlorine combines with the potassium, and the iron with the oxygen.

Thirdly, on boiling the precipitated hydrated sesquioxide of iron with the bitartrate of potassa, they combine in single equivalents to form the potassio-tartrate of iron; and the solution, if not quite saturated, is directed to be neutralized by the addition of ammonia.

Properties.—Colour, brownish-green; odour, none; taste, slightly chalybeate. It is readily soluble in water, and attracts moisture by exposure to the air. It has been shewn, in the Pharmacopœia, that it is incompatible with astringent vegetables, with which it gives a dark precipitate. The above process is taken from Soubeiran. It is a double salt, containing 13 per cent of the sesquioxide, according to the inventor.

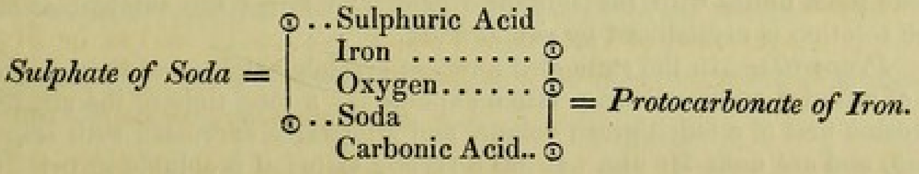
FERRI SESQUIOXYDUM.

Sesquioxide of Iron.

Chalybis Rubigo præparata, P. L. 1745.
Ferri Rubigo, P. L. 1788.
Ferri Carbonas, P. L. 1809.
Ferri Subcarbonas, P. L. 1824.

Composition.—1 equivalent of Iron................. = 28
1½ ——— Oxygen .... = 12
Equivalent 40

Decomposition.—The protocarbonate is first precipitated from a solution of sulphate of iron, by a solution of carbonate of soda.



Products.—Protocarbonate of Iron precipitated.
Sulphate of Soda in solution.

Nearly the whole of the protocarbonate is disturbed by exposure to the air during the process of washing away the sulphate of soda; and acquiring half another equivalent of oxygen, it loses its carbonic acid.

Product.—Sesquioxide of iron.

One hundred grains of this sesquioxide contain 4 grains of adherent undecomposed protocarbonate.

Properties.—It is of a brownish-red colour, seldom supplied twice together of the same hue, sometimes darker, sometimes more vivid. It is inodorous; taste, disagreeably chalybeate; soluble in hydrochloric acid, but not easily dissolved in other acids. It is commonly called peroxide of iron in the systems of chemistry. It is not magnetic.

Commentary.—Iron is only susceptible of two definite degrees of oxidizement, according to the best authorities. The hydrated protoxide, the hydrated peroxide (the mediate oxide of Gay Lussac), and the magnetic oxide, must all be considered as modifications of the protoxide and sesquioxide.

FERRI SULPHAS.

Sulphate of Iron.

Sal seu Vitriolum Martis, **P. L. 1720.**
Sal Martis, **P. L. 1745.**
Ferrum Vitriolatum, **P. L. 1788.**
Ferri Sulphas, **P. L. 1809, P. L. 1824.**

(Green Vitriol.)

Composition.—1 equivalent of Protoxide of Iron = 36
1 ——— Sulphuric Acid .. = 40
7 ——— Water.... 9×7 = 63
139

Decomposition.—The decomposition mainly depends upon the presence of the water. When the iron filings are thrown into the diluted acid, the water is decomposed; its 1 equivalent of oxygen unites with the iron to form a protoxide of iron, and its 1 equivalent of hydrogen escapes. The protoxide of iron, at the same time, unites with the sulphuric acid, and forms the sulphate as above, and the solution is crystallized by evaporation.

Properties.—In the state of the recent crystals, sulphate of iron or green vitriol is of a bluish-green colour. When exposed for a long time to the air, the crystals become first of a faded green colour, and afterwards encrusted with sesquioxide of iron, and are unfit for use. It has a styptic taste; it is soluble in twice its weight of cold, and three-fourths its weight of boiling water. *See* the Tests in the Pharmacopœia.

Commentary.—It is employed in preparing the sesquioxide of iron, the compound mixture of iron, and the compound pills of iron.

PRÆPARATA EX HYDRARGYRO.

Preparations of Mercury.

Mercury is found native, and in the state of cinnabar, or native sulphuret. It comes principally from Idria, in Carniola, and Almaden, in Spain; the mines at these places being the most productive in the known world. The ore is subjected to heat, in contact with lime or iron filings; so that the mercury is distilled, or rather volatalized, and freed from its sulphur, which is retained. Its characteristic property is, that it is fluid at all common temperatures. Its colour is tin-white; it has a strong metallic lustre; it solidifies at 39° or 40° below zero, and is strongly disposed to crystallize as it congeals. In this solid condition it is malleable, and may be cut with the knife. At 662° it boils, and becomes vapour. Its sp. gr. at 60° is 13·5. When pure, it is perfectly volatile. It is best purified by redistillation in an iron retort.

HYDRARGYRUM CUM CRETÂ.

Mercury with Chalk.

Hydrargyrus cum Cretâ, P. L. 1788.
Hydrargyrum cum Cretâ, P. L. 1809, P. L. 1824.

Composition.—It is a mixture of protoxide of mercury, metallic mercury, minutely divided, and chalk.—**Brande.**

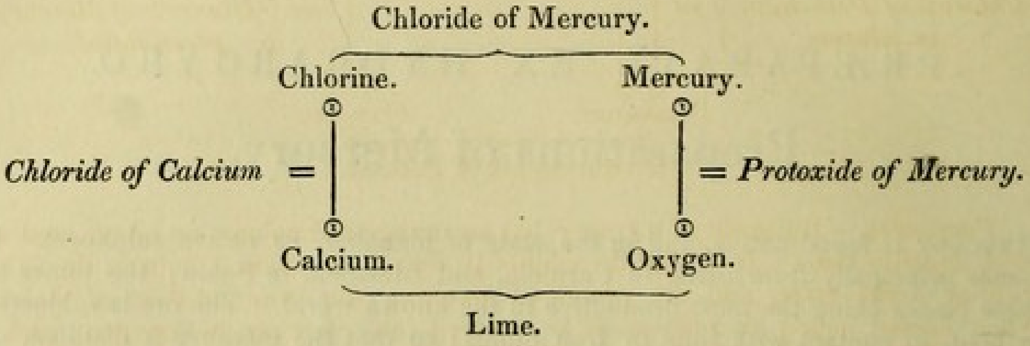
HYDRARGYRI OXYDUM.

Oxide of Mercury.

Hydrargyri Oxydum Cinereum, P. L. 1809, P. L. 1824.

Composition.—1 equivalent of Mercury ...... = 202 or 96·2
1 ——— Oxygen .... = 8 3·8
210 100

Decomposition.—When chloride of mercury (calomel) is thrown into lime-water, an exchange of elements takes place, the chlorine, attracting the calcium, forms a solution of chloride of calcium; while the mercury, uniting with the oxygen of the lime, forms protoxide of mercury, which is precipitated.



Properties.—A black powder, having a strong tendency to spontaneous decomposition; inodorous; acrid; insoluble in water; uniting with acids, but exerting little power as a base. From a solution of any of its salts calomel is precipitated by the addition of hydrochloric acid, which is the best characteristic test of its presence.

HYDRARGYRI BINOXYDUM.

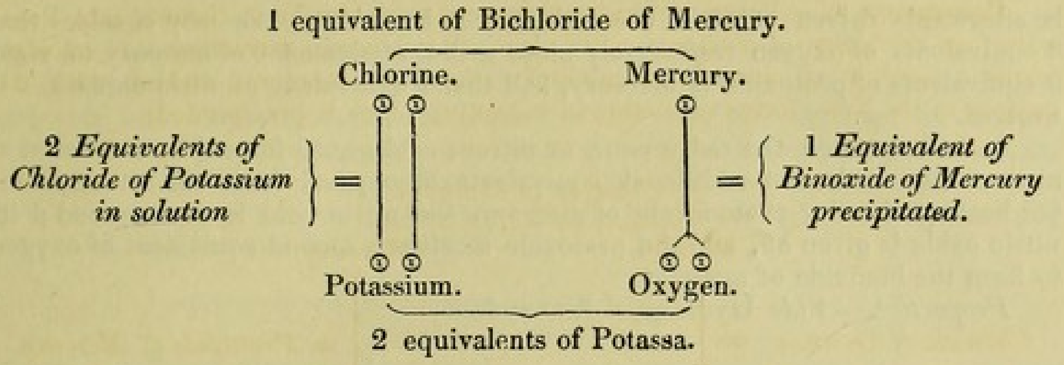
Binoxide of Mercury.

(Peroxide of Mercury.)

Mercurius Calcinatus, P. L. 1745.
Hydrargyrus Calcinatus, P. L. 1788.
Hydrargyri Oxydum rubrum, P. L. 1809, P. L. 1824.

Composition.—1 equivalent of Mercury......	= 202	or	92·7
2 ——— Oxygen	= 16		7·3
	218		100

Decomposition.—Bichloride of mercury is dissolved in water, and liquor of potassa is added. 2 equivalents of potassa are decomposed, and their 2 equivalents of oxygen unite with the mercury to form 1 equivalent of binoxide of mercury, which is precipitated; while the 2 equivalents of chlorine from the mercury unite with the 2 equivalents of potassium to form 2 equivalents of chloride of potassium in solution.



Properties.—Binoxide of mercury has an orange-red colour, no odour, and an acrid metallic taste. It is slightly soluble in water, to which it imparts the same peculiar acrid taste, and the power of greening the blue infusion of violets. When heated nearly to redness, it is resolved into mercury and oxygen; and a similar effect, according to Guibourt, is produced by long exposure to light.

HYDRARGYRI NITRICO-OXYDUM.

Nitric-Oxide of Mercury.

Mercurius Præcipitatus Corrosivus, P. L. 1720.
Mercurius Corrosivus ruber, P. L. 1745.
Hydrargyrus Nitratus ruber, P. L. 1788.
Hydrargyri Nitrico-Oxydum, P. L. 1809, P. L. 1824.

(*Vulgò*, Red Precipitate.)

Composition.—The same as the binoxide of mercury; but it is liable to contain a small portion of nitrate of mercury, which is just as good a reason for calling it a sub-nitrate, as for calling it a nitric-oxide. The collegiate translator might have further protracted* "the withering influence of the College," (over which, in 1816, he displayed the extreme acerbity of an uncompromising critic; and in whose company, in 1836, he discovered a new and curious combination of a truckle and a triumph), by whispering in the ears of the censors the ineptitude of the above name. On his own statement it consists of the same quantities of oxygen as the last preparation; and its composition, symbols, and incompatibles are similar. Why, therefore, call it nitric-oxide? Why not call it "*Hydrargyri Binoxydum per Acidum Nitricum?*"

Decomposition.—A portion of the nitric acid is decomposed by the mercury to form, firstly, protoxide of mercury; and secondly, by uniting with the undecomposed portion of the nitric acid, a protonitrate of mercury. The nitric acid

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* *Vide* Mr. R. Phillips's "Remarks on the Editio altera," page 34, published by W. Phillips, 1816.

is afterwards driven off, and the residue is a binoxide. We may consider that 3 equivalents of oxygen respectively unite with 3 equivalents of mercury to yield 3 equivalents of protoxide of mercury, and that 1 equivalent of nitric-oxide gas is evolved.

As before stated, the red vapour, or nitrous acid gas, is formed by the union of nitric oxide with two additional equivalents of oxygen from the atmosphere. On heating the dry protonitrate of mercury, the nitric acid is decomposed; its nitric oxide is given off, and the protoxide receives a second equivalent of oxygen to form the binoxide of mercury.

Properties.—*Vide* Hydrargyri Binoxydum.

HYDRARGYRI AMMONIO-CHLORIDUM.

Ammonio-Chloride of Mercury.

Mercurius Præcipitatus albus, P. L. 1745.
Calx Hydrargyri alba, P. L. 1788.
Hydrargyrus Præcipitatus albus, P. L. 1809.
Hydrargyrum Præcipitatum album, P. L. 1809, edit. altera,
P. L. 1824.

Composition.—This compound was originally (in 1745) ordered to be prepared by dissolving sal-ammoniac and corrosive sublimate, and precipitating with any alkali at the pleasure of the operator. Subsequently, liquor of potassa was ordered as the precipitant, and now the compound is formed in a more direct method by adding liquor of ammonia to a solution of bichloride. Mr. Brande assumes, from the experiments of Professor Kane, that it consists of (taking the old equivalent number, 200, for mercury)—

2 equivalents of	Bichloride of Mercury	= 544
2 ——	Ammonia	= 34
1 ——	Peroxide of Mercury (*i. e.* Binoxide)	= 216
		794

or, according to Mr. Hennell, of Apothecaries' Hall, of elements equivalent to

1 equivalent of	Peroxide of Mercury.
1 ——	Hydrochlorate of Ammonia.

Decomposition.—According to Mr. Hennell's view, the exchanges would be very easily understood. Bichloride of mercury decomposes the water; 2 equivalents of chlorine with 2 equivalents of hydrogen, form 2 equivalents of hydrochloric acid; which, with 2 equivalents of ammonia, will yield 2 equivalents of the hydrochlorate of ammonia (one left in solution, and the other precipitated in the ammonio-chloride of mercury), and the corresponding 2 equivalents of oxygen unite with the 1 equivalent of mercury, to form 1 equivalent of binoxide of mercury.

Product.—A compound of the hydrochlorate of ammonia, in combination with the binoxide of mercury, would (in this view) be precipitated.

The collegiate translator has framed a theory for explaining the decomposition, agreeably with Professor Kane's statement of the principles obtained by analysis from white precipitate; but, using the license of an experienced chemist, he makes his theory to fit the analysis, by first cutting down the analysis to fit the theory: for he rejects one of the two equivalents of bichloride of mercury from the resulting compound, and assumes it to consist of—

1 equivalent of Bichloride of Mercury	=	274
1 ——— Binoxide of Mercury	=	218
2 equivalents of Ammonia	=	34
		526

Thus throwing overboard the professor and his analysis, without assigning any reason why he is disposed to take this view of the composition.* If we admit that the ammonio-chloride contains 2 equivalents of bichloride of mercury, 1 equivalent of binoxide of mercury, and 2 equivalents of ammonia, the changes which occur may be as follow:—

Let us assume that we begin with 3 equivalents of bichloride of mercury to 4 equivalents of ammonia; 1 equivalent out of the 3 equivalents of bichloride is decomposed by, and reciprocally decomposes, 2 equivalents of water; and therefore the 2 of hydrogen with the 2 of chlorine will form 2 of hydrochloric acid; and this uniting with 2 out of the 4 equivalents of ammonia, will form hydrochlorate of ammonia in solution, afterwards poured off. The 2 of oxygen meantime unite with the single equivalent of mercury to form 1 equivalent of binoxide of mercury, and this precipitated with the 2 of bichloride of mercury undecomposed, and the 2 other equivalents of ammonia, constitutes the ammonio-chloride of mercury. This coincides with the analysis of Dr. Kane, and also with the statement of Mr. Brande ("Manual of Chemistry," page 791). But if we admit the precipitate to contain only 1 equivalent of the bichloride, we must assume that we commence with only 2 equivalents of the bichloride, and so we shall decompose only 1 equivalent by the water, and precipitate the other with 2 equivalents of ammonia and 1 equivalent of binoxide of mercury.

Properties.—It is a white powder, light, inodorous, and tasteless; soluble in the mineral acids, and exhales ammonia when smartly rubbed on the human body.

Collegiate Preparation.—Unguentum Hydrargyri Ammonio-Chloridi.

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* After nearly extinguishing a whole college of physicians, and getting them to pay him handsomely for his merciful attempts at resuscitation, to maim one doctor must be a mere trifle to him; but if he have no satisfactory reason for damaging the professor's analysis (however able in most of his critical conflicts), he must here succumb to Kane. If, however, as an editor, I might presume to give an opinion, it would certainly be in favour of Mr. Hennell's views, bowing with all deference to the superior practical experience of both.

HYDRARGYRI CHLORIDUM.

[Proto] Chloride of Mercury.

Calomelas, P. L. 1720.
Mercurius Dulcis Sublimatus, P. L. 1745.
Calomelas Hydrargyrus Muriatis Mitis, P. L. 1788.
*Hydrargyri Submurias,** P. L. 1809, P. L. 1824.

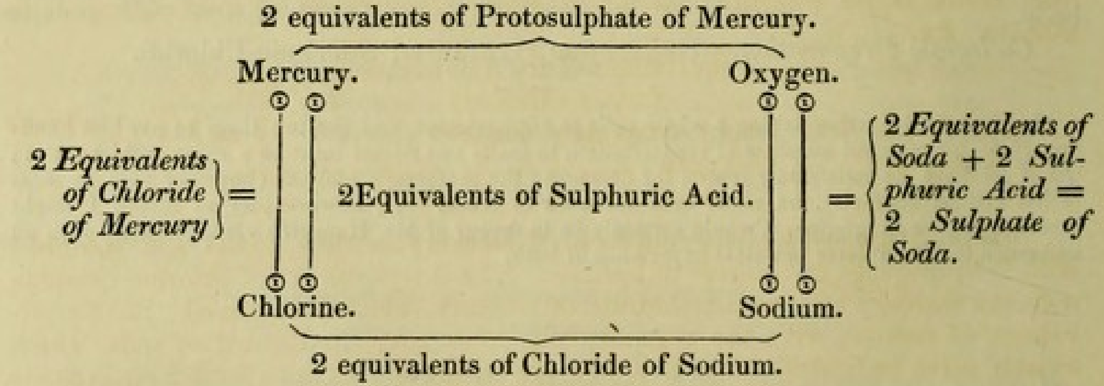
Composition.—1 equivalent of Mercury........ = 202 84
1 ——— Chlorine........ = 36 or 16
238 100

Decomposition.—First Stage. As in the preparing of the bichloride, so also in this process, mercury is first boiled with sulphuric acid to a dry residue, which is a bipersulphate, as may be seen by referring to my explanation under the head "Bichloride of Mercury." The more inexperienced student will please to note that the prefix *bi*, indicates the presence of 2 equivalents of sulphuric acid; and the second syllable, *per*, indicates 2 equivalents of oxygen, combined with 1 equivalent of mercury.

⊖ | ⊖ 2 equivalents of Sulphuric Acid = 80
⊖ | ⊖ 2 ——— Oxygen...... = 16
| ⊖ 1 ——— Mercury...... = 202
1 equivalent.. 298 of Bipersulphate of Mercury.

Second Stage.—When this product is rubbed with two other pounds of metallic mercury, it is reduced to a protosulphate of mercury, by surrendering half its oxygen and half its sulphuric acid to the additional metal; thus forming 2 equivalents of protosulphate of mercury.

Third Stage.—Lastly, The 2 equivalents of protosulphate are mixed and heated with 2 equivalents of chloride of sodium; and the most simple view of the exchanges may be conveyed by the subjoined diagram, indicating the double decomposition between the protoxide of mercury and the chloride of sodium.



The equivalent numbers are purposely omitted to avoid confusion, but when the student thoroughly comprehends the exchanges, it will be easy for him to introduce them.

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* "Among the alchemists it was variously and fancifully designated as *draco mitigatus, aquila mitigata, manna metallorum, panchymagogum minerale, sublimatum dulce, mercurius dulcis,*" &c.—Brande's "Chemistry," page 786.

Properties.—Chloride of mercury, protochloride of mercury, or calomel, should be quite tasteless, inodorous, and insoluble in water. Its sp. gr. is 7·2. When it is sublimed in small vessels, it condenses in a white semi-transparent crystalline cake; but if, on the contrary, it is conducted into a very capacious and cold receiver, it falls into a perfectly white and impalpable powder, which, after proper washing, is fit for use. Mr. Brande considers that the buff aspect of calomel indicates the absence of corrosive sublimate; but it does not follow that the snow-white calomel, which now more frequently occurs in the market, should therefore contain this impurity. It becomes yellow when heated, and white again as it cools. At something below a red-heat, it vaporizes without fusion. When crystalline cake-calomel is scratched or broken in the dark, it phosphoresces. It is decomposed by the fixed alkalies and by ammonia; and it is slowly affected by exposure to the atmosphere.

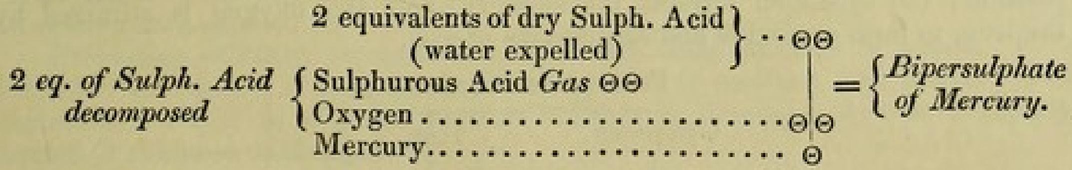
HYDRARGYRI BICHLORIDUM.

Bichloride of Mercury.

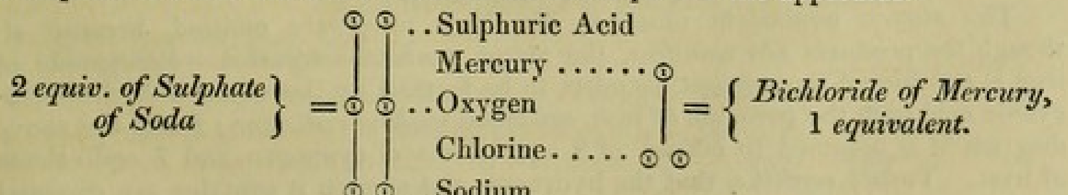
Mercurius Corrosivus Sublimatus, P. L. 1720, P. L. 1745.
Hydrargyrus Muriatus, P. L. 1788.
Hydrargyri Oxymurias, P. L. 1809, P. L. 1824.

Composition.—1 equivalent of Mercury ...... =	202	or	73·73
2 ——— Chlorine..36 × 2 =	72		26·27
	274		100

Decomposition.—First Stage. One equivalent of mercury (202) is boiled with 4 equivalents of liquid sulphuric acid (196), consisting of 4 equivalents of dry acid (160), and 4 equivalents of water (36); 2 equivalents of the dry acid (80) are decomposed, transferring 2 equivalents of oxygen (16) to the mercury, to form 1 equivalent of binoxide of mercury (218), which, uniting with the other 2 equivalents of dry acid (80), form 1 equivalent of bipersulphate of mercury (298), and 2 equivalents of sulphurous acid gas are expelled (64), the 4 equivalents of water (36) being evaporated. The student can introduce the equivalent figures, or omit them, at his pleasure: as for example, 1 equivalent of mercury equal to 202, &c. &c.



Second Stage.—The bipersulphate of mercury is then mixed and sublimed with 2 equivalents of chloride of sodium. The 2 equivalents of chlorine combine with the mercury to form a bichloride of mercury, which is sublimed; the 2 equivalents of sodium, with the 2 equivalents of oxygen, to form 2 of soda, which exactly serve to neutralize the 2 of dry sulphuric acid, so as to form 2 equivalents of sulphate of soda, which are found in the lower part of the apparatus.



The atoms on the right represent the principles which unite to form the bichloride, and on the left those uniting to form the 2 equivalents of sulphate of soda.

Properties.—It is a semi-transparent, colourless substance, of a crystalline texture. It has a nauseous metallic taste, acrid and burning; and it is inodorous. It is soluble in twenty times its weight of cold, and twice its weight of boiling water, and in the same proportion of alcohol or æther. The pure and carbonated fixed alkalies throw down a hydrated peroxide of mercury from a solution of this bichloride, in the form of a yellowish-red precipitate, as in the yellow wash; but ammonia casts down a white substance, called white precipitate, the composition of which is at present uncertain.

LIQUOR HYDRARGYRI BICHLORIDI.

Solution of Bichloride of Mercury.

Liquor Hydrargyri Oxymuriatis, P. L. 1809, P. L. 1824.

Commentary.—Hydrochlorate of ammonia is employed instead of the spirit formerly used to increase the solvent power of the water.

HYDRARGYRI BICYANIDUM.

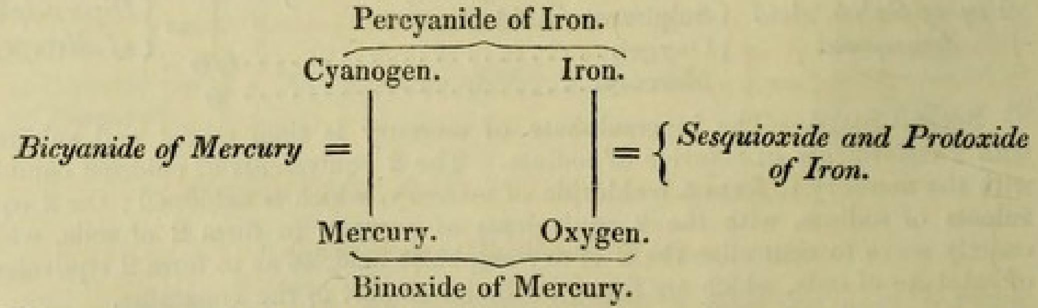
Bicyanide of Mercury.

(Called also Bicyanuret of Mercury.)

Composition.—

2 equivalents of Cyanogen	26 × 2 =	52	or 20·4
1 equivalent of Mercury..............	=	202	79·6
		254	100

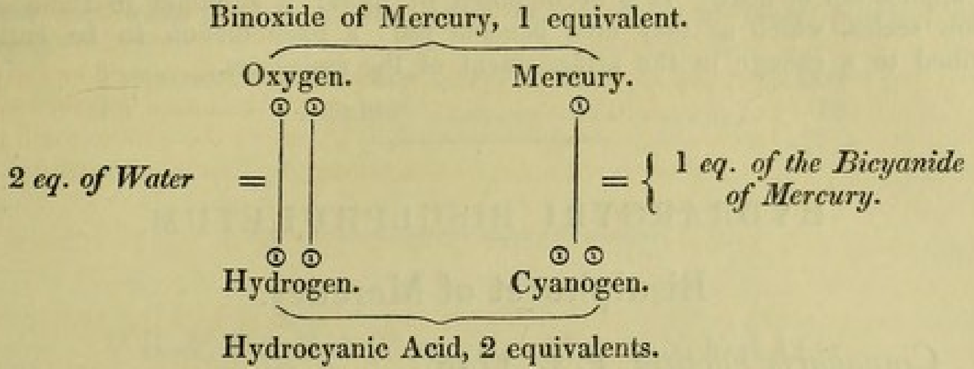
Decomposition.—Percyanide, or sesquiferrocyanuret of iron, commonly called Prussian blue, and constituted of cyanogen and iron, is boiled in water with binoxide of mercury. This is what Fourcroy used to call a double decomposition; the cyanogen attracts the mercury, and the oxygen is attracted by the iron, to form protoxide and sesquioxide of iron.



The atomic equivalent numbers are here purposely omitted, because although the products are manifest, the atoms cannot be adjusted. Percyanide of iron is considered by eminent chemists to be formed by the union of hydro-ferrocyanic acid with the peroxide of iron, *combined without reduction;* but in the above diagram it is assumed to consist of 9 equivalents of cyanogen and 7 equivalents of iron. Turner remarks, that the hydrogen and oxygen it contains are essential to its existence as Prussian blue.

Products.—The protoxide and sesquioxide of iron precipitated. The bicyanide of mercury dissolved and crystallized.

Second Process.—When prepared by adding binoxide of mercury to hydrocyanic acid, the exchanges are as following :—



Properties.—The crystals are much more soluble in hot than in cold water. According to Brande, if the solution be filtered while hot, it deposits on cooling yellowish white crystals, in form of quadrangular prisms; but those prepared by the collegiate process should be colourless. The attraction of mercury for cyanogen is so powerful, that the compound is not disturbed by the alkalies, and the peroxide of mercury will detach the cyanogen from any of the cyanides. An aqueous solution is, however, decomposed by hydrosulphuric acid and its compounds.

Use.—To prepare hydrocyanic acid.—*Vide* Pharmacopœia, page 53.

HYDRARGYRI IODIDUM.

Iodide of Mercury.

(Protiodide of Mercury.)

Composition.—

1 equivalent of Mercury	=	202 or	38·4
1 —— Iodine	=	126	61·6
Equivalent		328	100

A direct combination of the metal and the iodine in single equivalents, by trituration with alcohol.

Properties.—Colour, an unclean yellow, with some mixture of green. It is insoluble in water. If long exposed to light, it is resolved into mercury and periodide. Fused in a gentle heat, it is similarly decomposed; but if rapidly heated, it sublimes unchanged.

HYDRARGYRI BINIODIDUM.

Biniodide of Mercury.

(Deutiodide, Periodide.)

Composition.—It consists of—

1 equivalent of Mercury	=	202	44·5
2 —— Iodine	=	252	55·5
		454	100

A direct combination of 2 equivalents of iodine with 1 equivalent of the metal by trituration with alcohol, the quantity of iodine employed being exactly twice as much as in the last preparation.

Properties.—A scarlet-red powder, which is easily fusible, and turns yellow by the application of heat. It is decomposed by light; it sublimes in rhomboidal yellow scales, which as they cool become red: a phenomenon to be entirely ascribed to a change in the arrangement of the molecules.

HYDRARGYRI BISULPHURETUM.

Bisulphuret of Mercury.

Cinnabaris Factitia, **P. L. 1745.**
Hydrargyrus Sulphuratus ruber, **P. L. 1788.**
Hydrargyri Sulphuretum rubrum, **P. L. 1809, P. L. 1824.**

(Vermilion, Cinnabar, Persulphuret.)

Composition.—2 equivalents of Sulphur......	16 × 2 =	32	13·6
1 equivalent of Mercury	=	202	86·4
		234	100

Chemical Reaction.—The heat favours the union of 2 equivalents of sulphur and one of mercury, and by continuing it, any excess of sulphur beyond the 2 equivalents is expelled.

Properties.—Permanent, when exposed to air or moisture; colour of the powder, brilliant red; inodorous; insipid; heated to dull redness in an open vessel, the sulphur forms sulphurous acid, and the mercury escapes in vapour.

HYDRARGYRI SULPHURETUM CUM SULPHURE.

Sulphuret of Mercury with Sulphur.

Æthiops Mineralis, **P. L. 1745.**
Hydrargyrus cum Sulphure, **P. L. 1788.**
Hydrargyri Sulphuretum nigrum, **P. L. 1824.**

(Also now called Protosulphuret, and Æthiop's Mineral.)

Composition.—When this compound is boiled in solution of potassa, sulphur is taken up, and bisulphuret of mercury is precipitated, so that it may be inferred to be a mixture of the bisulphuret with sulphur, consisting of—

Bisulphuret of Mercury	58	
Sulphur	42	
	100	*Vide* " Journal of Science," vol. xviii. p. 294.

Properties.—Black, tasteless, and inodorous.

Commentary.—According to Guibourt, a true protosulphuret of mercury may be prepared by passing a stream of hydrosulphurous acid through a weak solution of protonitrate of mercury, or through a mixture of very finely divided calomel and water; it is thrown down in the form of black powder, consisting of

1 equivalent of Mercury	202
1 ——— Sulphur	16
	218

PRÆPARATA È MAGNESIO.

Preparations of Magnesium.

The metal itself has considerable brilliancy and malleability, and may be fused at a red heat. It is slightly oxidized in moist air, but in a dry air it is not affected. When heated to redness, it burns with brilliancy in oxygen gas, yielding magnesia; and it spontaneously inflames in chlorine.

MAGNESIA.

Magnesia.

Magnesia Usta, P. L. 1788.
Magnesia, P. L. 1809, P. L. 1824.

Composition.—1 equivalent of Oxygen	=	8	40
1 ——— Magnesium	=	12	60
Equivalent		20	100

This is the only oxide of magnesium.

Decomposition.—Carbonic acid expelled by a strong heat, leaving the pure magnesia.

Properties.—A white friable powder; insipid, colourless, and free from odour; slightly greens the blue of violet, and reddens turmeric; infusible, and all but insoluble; it forms bitter saline compounds with the acids; the bitterness of its sulphate is a distinguishing characteristic of its presence, because the sulphates of the other alkaline earths are tasteless, while those of the earths properly so called are sweet or astringent. It absorbs both water and carbonic acid by exposure to the air, and it should therefore be preserved in well-closed bottles.

Commentary.—The concentrated preparation of magnesia, sold as an aperient, is a solution of the bicarbonate, with excess of carbonic acid. Dinneford's preparation contains about 18 grs. in a fluidounce of distilled water, and the solution is effected by a pressure equal to that of 4 atmospheres. An ounce or two of this preparation, with the addition of a little lemon-juice, forms a mild aperient for delicate habits. With reference to its antacid properties, it is the best corrective and ordinary aperient throughout the stages of infancy.

MAGNESIÆ CARBONAS.

Carbonate of Magnesia.

Magnesia alba, P. L. 1788.
Magnesiæ Carbonas, P. L. 1809.
Magnesiæ Subcarbonas, P. L. 1824.

Composition.—1 equivalent of Carbonic Acid	= 22	52·4
1 ——— Magnesia	= 20	47·6
	42	100

But this by no means coincides with either of the analyses of Kirwan, Bergman, Dalton, and others. Mr. Brande considers it a compound of 1 equivalent of quadrihydrate of magnesia, and 1 equivalent of carbonate of magnesia. It is usually found to contain water.

Decomposition.—Sulphate of magnesia and carbonate of soda are separately dissolved, and then boiled together, leading to a reciprocal exchange of acids and bases.

Properties.—It has neither colour, nor odour, nor taste, and is not affected by exposure to the atmosphere. It is more soluble in cold than in hot water, but very sparingly in either, and hence is often described as insoluble in water. By the last process it will be seen, that heat expels its carbonic acid.

Note.—For the composition and methods of preparing sulphate of magnesia with the theories of the same, refer *ad finem*, under the section of "Trade Chemicals for which there are no formulæ in the Pharmacopœia."

Commentary.—I have noticed, under the head Magnesia, the solution of bicarbonate surcharged with carbonic acid, to which the attention of the public has again lately been called by a gentleman who is styled, in various advertisements, Sir J. Murray, Dr. Murray, and Mr. Murray, and who, in his or their three advertisements (for I suppose it to be a trinity in unity), lays claim to the invention. The process is contained in several Pharmacopœias of nearly half a century back, and occurs in every system of chemistry with which I am acquainted; and his attempt by a monopoly of the article to obtain a penny a bottle on the general sale throughout England, is equally unworthy of his golden order as it is of his doctorate. On the 19th of August, 1839, Sir James allows "his fluid magnesia" to be advertised in the *Times;* and I find that not only are the advertisements in his own hand-writing, but that he calls himself in his correspondence with the trade the inventor and proprietor, and yet at a meeting* of the Surgical Society of Ireland, December 1, 1838, he professed his ignorance of the exact mode of preparing it, and frankly admitted that the process had been greatly improved by his pupils (?) now established in London. Magnesia water (bicarbonated) by the force of pressure, had been publicly sold in this metropolis at a few pence the glass twenty years ago, within my experience, and under my notice. Sir James ought to be elected as a colleague of the Censors of our Royal College, were it only for his adroitness in writing advertisements. They may find him useful in this respect when they bring out their next Pharmacopœia. Either or any of the present vendors have an equal claim to the merit of introducing the article in a more concentrated form, and so long as they do not attempt a monopoly, they have my good wishes for their success. The crystals which form on the bottles are not magnesia, but hydrated carbonate, and what becomes of them when put into hot water or a hot stomach (acid not being present in that organ) or even into cold water, *chemists ought to know*, and I shall leave the public to find out. I will gratuitously instruct any person to make it who may feel so disposed.

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* At this meeting, as at another in Liverpool, the worthy knight declared (upon his honour, of course,) that he had no interest or connexion with the sale of the remedy; and yet I have seen his letters, dated only July, 1839, in which he negotiates the sale of it.

PRÆPARATA È PLUMBO.

Preparations of Lead.

Native lead is extremely rare. All the lead of commerce is extracted from the native sulphuret, commonly called galena. Lead is of a bluish-grey colour, possessing considerable lustre before exposure to the atmosphere, which forms upon it a tarnish of protoxide, or of carbonate of lead. It is remarkable for its malleability; it is in a less degree ductile, and inferior in tenacity to all ductile metals. It fuses at 612° and crystallizes in octohedrons. When melted in open vessels, it presents on its surface a dross or film, which is a mixture of the metal with protoxide of lead. Lead is not affected by hydrochloric or the vegetable acids, but their presence, as in cider-vats, is supposed to accelerate the absorption of oxygen from the atmosphere.

There are four oxides of lead:—

1 equiv. Lead	104 + 1 equiv. Oxygen		8	=	112 Protoxide; the salifiable Oxide, or Yellow Massicot; Litharge.
3	—— 312 + 4	——	32	=	344 Deutoxide; Red Lead; Minium; Red Binoxide.
1	—— 104 + 2	——	16	=	120 Peroxide, Brown Binoxide.
2	—— 208 + 1	——	8	=	216 Dinoxide, Suboxide.

The protoxide is placed first in this order, as being the medicinal oxide.

In its ordinary state, the protoxide is of an orange or lemon yellow, and called massicot; when fused at a high red-heat, it forms on cooling a lamellar semi-vitreous mass, of a reddish-brown colour; and when obtained in scales, it constitutes the litharge of the shops, and the variety of the protoxide directed in the Pharmacopœia.

PLUMBI ACETAS.

Acetate of Lead (Neutral).

Saccharum Saturni, P. L. 1720.
Cerussa Acetata, P. L. 1788.
Plumbi Superacetas, P. L. 1809.
Plumbi Acetas, P. L. 1824.

Composition.—The Acetate of Lead consists of—

1 equivalent of Protoxide of Lead....	=	112	26·8
1 —— Acetic Acid	=	51	58·9
3 equivalents of Water	=	27	14·3
Equivalent....		190	100

Decomposition.—It is a direct combination of the metallic oxide with the acetic acid, and the crystals of the acetate are obtained by evaporating the solution.

Properties.—Like the solution, the crystals should be colourless. Acetate of lead has a faint, peculiar odour, and a singularly sweetish taste. The crystals are permanent at ordinary states of the atmosphere, but they effloresce at 100°. Water at 60° dissolves little better than a fourth of its weight of this acetate, and even when boiled upon the salt it takes up very little more. It is always more or less decomposed when dissolved in undistilled water, by carbonic acid and adventitious salts. If 1 part of this salt is dissolved in 24 parts of water, and a piece of zinc is suspended in the solution by means of a thread, the lead becomes detached from the salt and is deposited on the zinc, to form the *Arbor Saturni.*

LIQUOR PLUMBI DIACETATIS.

Liquor of Diacetate of Lead.

Aqua Lythargyri Acetati, P. L. 1788.
Liquor Plumbi Acetatis, P. L. 1809.
Liquor Plumbi Subacetatis, P. L. 1824.

(Goulard's Extract, or Extract of Saturn.)

Composition.—The acetic acid attracts a second equivalent of oxide of lead. The diacetate thus formed consists of—

1 equivalent of Acetic Acid..........	= 51	18·5
2 ——— Oxide of Lead..112×2	= 224	81·5
	275	100

Properties.—Unlike the brown preparation which we have long been accustomed to, this is colourless, and has a rough sweetish taste. It is decomposed by most common water, and the precipitates give to the admixture a milky opacity, which to the public is the most distinguishing characteristic of the diluted liquor.

LIQUOR PLUMBI DIACETATIS DILUTUS.

Diluted Liquor of Diacetate of Lead.

Aqua Lithargyri Acetati composita, P. L. 1788.
Liquor Plumbi Subacetatis dilutus, P. L. 1809, P.L. 1824.

(Goulard, or Goulard's, Lotion.)

Note.—Even when made with distilled water, this preparation will not be clear if the water has absorbed carbonic acid by long exposure to the air.

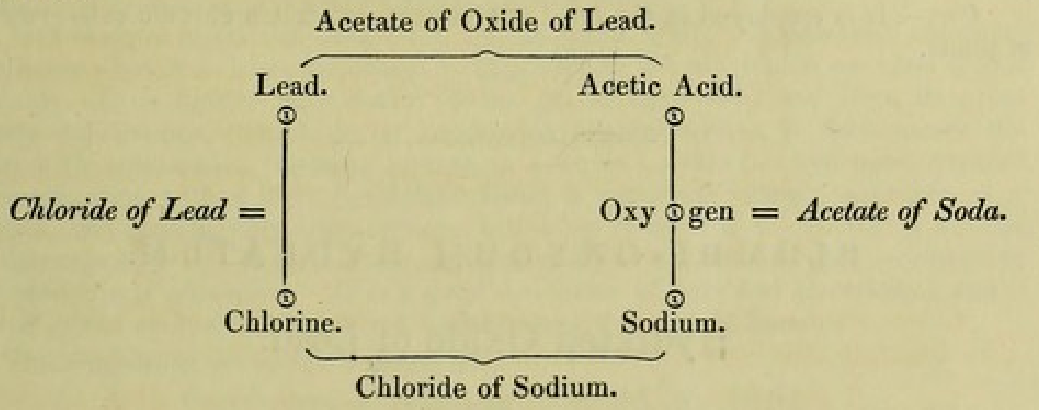
PLUMBI CHLORIDUM.

Chloride of Lead.

(Horn Lead.)

Composition.—			
1 equivalent of Chlorine	=	36	25·7
1 ——— Lead	=	104	74·3
Equivalent..		140	100

Decomposition.—Acetate of lead and chloride of sodium are separately dissolved, and the solutions are mixed. The chlorine combines with the lead to form chloride of lead precipitated; while the sodium, with the oxygen of the oxide of lead, forming soda, is neutralized by the acetic acid to form acetate of soda in solution.



Properties.—Chloride of lead is white, fusible; and on cooling, after fusion, it acquires a horn-like appearance, in which state it has been called horn lead. According to Faraday it does not absorb ammonia: it volatilizes at high temperatures. It requires for its solution 30 parts of water at 60°, or 22 parts at 212°; and from the solution, as it cools, small anhydrous, acicular crystals, are deposited. These have a sweetish taste, and are unchanged by exposure to the air. Chloride of lead may also be formed by heating laminated lead in chlorine.

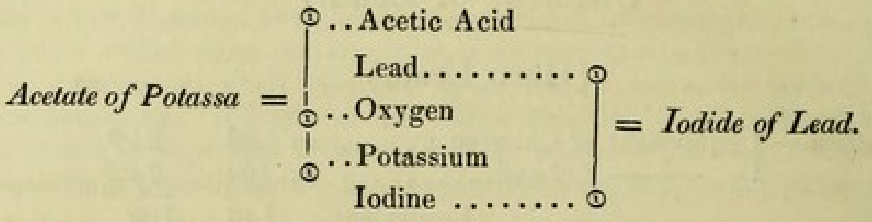
Use.—It is employed in preparing hydrochlorate of morphia.

PLUMBI IODIDUM.

Iodide of Lead.

Composition.—		
1 equivalent of Iodine	=	126
1 ——— Lead	=	104
Equivalent..		230

Decomposition.—Acetate of lead and iodide of potassium are separately dissolved in water; and on mixing the solution, the exchanges are similar to those which take place in the last process: 1 equivalent of lead unites with 1 equivalent of iodine to form 1 equivalent of iodide of lead; the 1 equivalent of oxygen, which was previously in combination with the 1 equivalent of lead, converts the potassium into 1 equivalent of potassa, which is neutralized by the 1 equivalent of acetic acid to form 1 equivalent of acetate of potassa in solution.



Properties.—It is of a rich yellow colour, sparingly soluble in cold water: dissolves by boiling water, forming a solution which is colourless, and on cooling, brilliant yellow crystalline scales are deposited. It is soluble in liquor potassæ. Iodide of lead may also be prepared by heating leaf-lead with iodine, or by adding iodide of potassium to a solution of nitrate of lead.

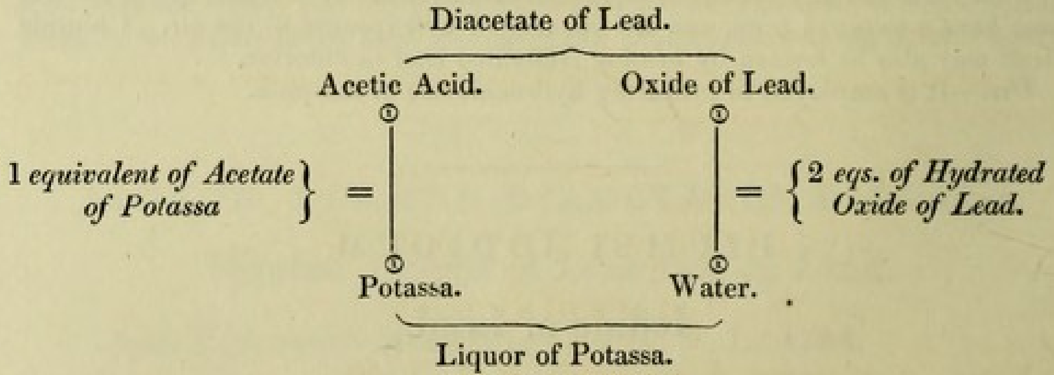
Use.—It is employed in the form of ointment, in certain chronic enlargements of joints.

PLUMBI-OXYDUM HYDRATUM.

Hydrated Oxide of Lead.

Composition.—Oxide of lead with water.

Decomposition.—Solutions of diacetate of lead and potassa are mixed. The 2 equivalents of acetic acid combine with 2 of potassa to form 2 of acetate of potassa; while 1 equivalent of oxide of lead combines with 1 equivalent of water to form hydrated oxide of lead.



Properties.—It is a dead white powder, soluble in excess of potassa; and hence the danger of employing too much of this last alkali. It is blackened by hydrosulphuric acid. It is almost entirely soluble in nitric acid. With hydrochloric acid it precipitates a chloride, and with sulphuric acid a sulphate of lead.

Use.—In preparing the disulphate of quina.

PRÆPARATA È POTASSIO.

Preparations of Potassium.

Potassium may be obtained by submitting hydrate of potassa to the powerfully decomposing action of Voltaic electricity: the metal is evolved at the negative pole. It is also obtained by heating fused (hydrated) potassa in a bent gun-barrel, with clean iron turnings. Hydrogen gas escapes from the water of the hydrated potassa, and the oxygen is attracted by the iron. The potassium is found in globules in the tube and receiver, now commonly fitted on to the barrel. Brunner has improved both processes, by decomposing potassa by means of iron and charcoal, intimately mixed and heated in an iron bottle.

This curious metal was discovered by Davy, in 1807. It possesses considerable lustre; but it is soon tarnished by exposure to the air, which converts it into an oxide. It is lighter than water, its sp. gr. being 0·835; and from its great affinity for oxygen (which is its prominent characteristic), it decomposes the water with combustion, forming potassa in solution; while the hydrogen, evolved in combination with a little potassium, forms a compound which takes fire as it escapes, and considerably augments the brilliancy of the flame. At 55° it has the consistency of wax. It forms two definite compounds with oxygen,—protoxide and peroxide of potassium. It is a good conductor of heat and electricity; and if heated in the open air, it takes fire, and burns with a purple flame.

The anhydrous protoxide consists of—

1 equivalent of Potassium ..	= 40	or 83·34
1 ——— Oxygen	= 8	16·66
Equivalent..	48	100

The peroxide consists of—

3 equivalents of Oxygen....	8 × 3	= 24
1 ——— Potassium.......		= 40
		64

Berzelius admits a suboxide, which is conjectured by others to consist of a mixture of potassium with oxygen.

LIQUOR POTASSÆ.

Liquor of Potassa.

Lixivium Saponarium, P. L. 1745.
Aqua Kali puri, P. L. 1788.
Liquor Potassæ, P. L. 1809, P. L. 1824.

Composition.—A solution of caustic potassa in distilled water.

Decomposition.—Single elective affinity. Lime being boiled with a solution of carbonate of potassa, separates the carbonic acid to form an insoluble carbonate, and the potassa is left in solution. A separates B from C.

Properties.—Caustic solution of potassa is transparent, colourless, inodorous; its taste is extremely acrid; rubbed between the fingers it partly dissolves the cuticle; it has an oily or soapy feel: sp. gr. 1·063. It attracts carbonic acid by exposure to the air; and therefore the old plan of filtering the solution is prudently dispensed with. Some chemists constantly keep a lump of quicklime in the bottle, to react upon any carbonic acid that may be absorbed. Liquor of potassa gradually acts upon white glass; and hence green glass is ordered in preference. Liebig has noticed that a strong solution of caustic potassa actually deprives carbonate of lime of its carbonic acid. Hence the propriety of using a liberal proportion of water.

LIQUOR POTASSÆ CARBONATIS.

Solution of Carbonate of Potassa.

Oleum Tartari per deliquium, P. L. 1720.
Lixivium Tartari, P. L. 1745.
Aqua Kali præparati, P. L. 1788.
Liquor Potassæ Subcarbonatis, P. L. 1809, P. L. 1824.

Properties.—It is a colourless fluid, possessing a faint alkaline smell, and a strong disagreeable taste: sp. gr. 1·473.

POTASSA CUM CALCE.

Potassa with Lime.

Causticum Commune fortius, P. L. 1745.
Calx cum Kali puro, P. L. 1788.
Potassa cum Calce, P. L. 1809, P.L. 1824.

Note.—In this admixture the lime is added to render the potassa less deliquescent, and therefore more convenient and limitable as a caustic. From the Pharmacopœia of 1745 I extract the "Causticum Commune mitius," because it is still preferred by some surgeons for establishing issues.

Take of Soft Soap,
Quick Lime, of each equal weights.
Let them be thoroughly mixed at the time of use.

POTASSÆ HYDRAS.

Hydrate of Potassa.

Lapis Infernalis sive Septicus, P. L. 1720.
Kali purum, P. L. 1788.
Potassa Fusa, P. L. 1809, P. L. 1824.

Composition.—Caustic or pure Potassa, more properly called Hydrate of Potassa, consists of—

		Berzelius.
1 equivalent of Potassa........	= 48	or 84
1 ——— Water.........	= 9	16
Equivalent.........	57	in 100

The process formerly consisted in boiling pure carbonate of potassa in a clean iron vessel over the fire, with half its weight of quick lime; but, according to the present mode, we boil down the caustic solution of potassa, and the white hard residue is a direct compound of potassa and water as above.

Properties.—White, brittle, hard, corrosive; evaporating at a bright-red heat; extremely deliquescent, and therefore inconvenient as a caustic: soluble in half its weight of water at 60°; unites with oils to form soap. By exposure, it attracts water and carbonic acid.

POTASSÆ ACETAS.

Acetate of Potassa.

Sal Diureticus, P. L. 1745.
Kali Acetatum, P. L. 1788.
Potassæ Acetas, P. L. 1809, P. L. 1824.

(Febrifuge Salt of Sylvius.)

Composition.—It consists of—

1 equivalent of Acetic Acid..........	= 51	or 51·4
1 ——— Potassa................	= 48	48·6
Equivalent......	99	100

Decomposition.—Carbonate of potassa decomposed by acetic acid. Single elective affinity. The potassa preferring the acetic acid, forms an acetate of potassa, and the carbonic acid is expelled. A separates B from C.

Properties.—Soluble in its own weight of water at 60° and in half its weight of boiling alcohol. It should be colourless and pulverulent. It is highly deliquescent. It is nearly, but not altogether, free from a faint acetous odour. Carbonic acid decomposes the alcoholic solution of this salt, carbonate of potassa being deposited, and acetic acid set free. Hence the student will remark, that an alteration of the circumstances, or condition of existence of bodies, may reverse their reciprocal affinities.

POTASSÆ CARBONAS.

Carbonate of Potassa.

Sal Absinthii, Sal Tartari, P. L. 1745.
Kali Præparatum, P. L. 1788.
Potassæ Subcarbonas, P. L. 1809, P. L. 1824.

Process of preparing the Carbonate of Potassa.—It is simply a process of purification, the impure carbonate being prepared by the incineration and lixiviation of land-plants, and chiefly from the vast natural forests of North America. It is called wood-ash, pearl-ash, and pot-ash. Much of the earthy impurities is got rid of by the process of solution and straining; but it is not a pure carbonate.

Composition.—1 equivalent of Carbonic Acid = 22 or 31·43
1 ——— Potassa...... = 48 68·57
Equivalent.. 70 100

The salt contains 1½ equivalent of water.

Properties.—It is deliquescent; very soluble in water, which at 55° takes up its own weight; fusible, without decomposition, at a red heat; colourless; has an alkaline odour and taste, although described by some chemists as inodorous. It has the usual alkaline reaction, turning vegetable blues green, and yellows brown.

Collegiate Preparations.—Liquor Potassæ, Liquor Potassæ Carbonatis, Potassæ Acetas, Potassæ Sulphas, Potassæ Tartras, Potassii Sulphuretum, Liquor Potassæ Arsenitis, Spiritus Ammoniæ, Spiritus Ammoniæ Aromaticus, Spiritus Ammoniæ fœtidus, Decoctum Aloës compositum, Mistura Ferri composita, Pilulæ Ferri compositæ.

Commentary.—It is totally impossible for any dispenser to infer which of the carbonates a practitioner may mean in a prescription. I have taken some pains to inquire, and have found not a few instances of confusion, both as regards this and other newly-named preparations. The result of my inquiries (and I have repeatedly been present at such discussions between physician and chemist) is, that the latter does not know which compound the former means, and the former not unfrequently does not know which he means himself. It is the Tower of Babel again attempted to be erected in Pall Mall East. Let me ask how it is possible to know the intention of the prescriber, unless he premises the Pharmacopœia from which he quotes?

POTASSÆ BICARBONAS.

Bicarbonate of Potassa.

Potassæ Carbonas, P. L. 1809, P. L. 1824.

Composition.—2 equivalents of Carbonic Acid .. 22 × 2 = 44 or 43·56
1 ——— Potassa .... = 48 47·53
1 ——— Water .... = 9 8·91
Equivalent 101 100

Decomposition.—A current of carbonic acid is passed through a solution of carbonate of potassa, which last compound we know to consist of 1 potassa and

1 carbonic acid. The potassa takes a second equivalent of carbonic acid to form a bicarbonate of potassa. The carbonic acid employed for this purpose is directed to be extricated from powdered chalk (carbonic acid and lime), by the addition of sulphuric acid diluted with water; and this is another instance of single elective affinity, so manifest as not to require explanation. As I have repeatedly stated, it is merely A separating B from C by superior power of attraction.

Properties.—Bicarbonate of potassa is not deliquescent. Its taste is only slightly alkaline. It is soluble in four parts of water at 60° and in its own weight of boiling water; but during the solution, the heat separates a portion of the carbonic acid. Like the carbonate, it is insoluble in alcohol. Dr. Wollaston first observed that it contains twice the quantity of carbonic acid existing in the carbonate.

LIQUOR POTASSÆ EFFERVESCENS.

Effervescing Solution of Potassa.

Commentary.—This is an agreeable form in which to take the bicarbonate of potassa; but where the curative object is to neutralize acidity, the presence of a large surplus of acid seems objectionable. Carbonic acid thus taken is not entirely eructated. It probably has its influence on the kidneys.

POTASSÆ SULPHAS.

Sulphate of Potassa.

Tartarum Vitriolatum, P. L. 1720, P. L. 1745.
Kali Vitriolatum, P. L. 1788.
Potassæ Sulphas, P. L. 1809, P. L. 1824.

(Sal Polychrest.)

Composition.—

			Dalton.
1 equivalent of Sulphuric Acid.....	= 40	or	44·7
1 —— Potassa............	= 48		55·3
Equivalent..	88		100

Decomposition.—The salt which remains after the distillation of nitric acid is here considered as a bisulphate, or supersulphate of potassa, containing an excess or surplus of acid beyond what is required to form the sulphate. This surplus of sulphuric acid is now expelled by igniting the salt in a crucible. The older method was to saturate the excess by the addition of carbonate of potassa.

Properties.—Sulphate of potassa is colourless, inodorous; has a bitter saline taste, and its crystals are anhydrous. One drachm is soluble in about two ounces of cold, or in five fluidrachms of boiling water: it is insoluble in alcohol. It decrepitates and melts at a red heat, but is not decomposed by it. It suffers no deterioration or change by exposure to the air. When one drachm has been dissolved in two ounces of any watery vehicle, by the addition of any tincture, a portion of the sulphate is precipitated.

Commentary.—The former Edinburgh Pharmacopœia, in addition to the sulphate as above procured, contained a sulphas potassæ obtained by deflagrating equal parts of nitre and sulphur. The process of manufacturing sulphuric acid (*vide* page 12) furnishes a similar residue.

POTASSÆ BISULPHAS.

Bisulphate of Potassa.

Potassæ Supersulphas, **P. L. 1809, P. L. 1824.**

Composition.—It consists of—

2 equivalents of Sulphuric Acid	40 × 2 = 80	or	54·8
1 —— Potassa	= 48		32·9
2 —— Water	9 × 2 = 18		12·3
Equivalent	146		100

Chemical Process.—In the last preparation, I stated that the salt which remains after the distillation of nitric acid is a bisulphate, or supersulphate of potassa; that is to say, either a compound of 1 potassa and 2 sulphuric acid, or 1 potassa and 1½ sulphuric acid; in which latter case, the second equivalent is divided between the water and the sulphate of potassa, and forms what may be called a sesquisulphate of potassa. In the process above, according to the present Pharmacopœia, sulphuric acid is added to ensure the presence of sufficient acid to complete the bisulphate.—*Vide* the Analysis of Mr. Phillips, "Philosophical Magazine," N. S., vol. ii. 420.

Properties.—Sour and bitter; its sourness probably arising from the facility with which the second atom is detached; and for the same reason it is used at the Mint for cleansing copper coin. The crystals are soluble in half their weight of water at 40°. When dissolved in a large quantity of water and evaporated, crystals of the neutral sulphate are deposited, and a sour liquor remains. A steady red heat expels the excess of acid.—*Vide* Sulphate of Potassa. Alcohol added to a solution of this salt also precipitates the bisulphate.

Commentary.—This process, according to the Collegiate Translator's own shewing, is founded on a contingency; for he recognizes the salt remaining, after the distillation of nitric acid, as a bisulphate of potassa.

POTASSÆ TARTRAS.

Tartrate of Potassa (Neutral).

Tartarum Solubile, P. L. 1745.
Kali Tartarizatum, P. L. 1788.
Potassæ Tartras, **P. L. 1809, P. L. 1824.**

Composition.—It is anhydrous, and consists of—

1 equivalent of Tartaric Acid	= 66	or	57·9
1 —— Potassa	= 48		42·1
Equivalent	114		100

Decomposition.—Tartrate of potassa, commonly called soluble tartar, is made from cream of tartar (bitartrate of potassa) by boiling it with carbonate of potassa. By single elective affinity, the potassa unites with the second equivalent of tartaric acid, forming a neutral tartrate, and the carbonic acid escapes.

Products.—2 equivalents of Tartrate of Potassa.
1 ——— Carbonic Acid Gas evolved.

Properties.—Soluble in less than twice its weight of water, nearly insoluble in alcohol. Its taste is saline and bitter, but less disagreeable than that of most of the other saline aperients. It is slightly deliquescent in a damp atmosphere. Like the bitartrate, at a red heat it fuses, and is decomposed, and the resulting compound is carbonic acid. It should be perfectly neutral. It ought to be kept in crystals.

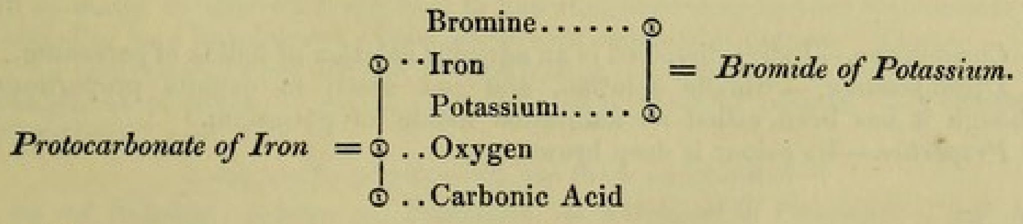
POTASSII BROMIDUM.

Bromide of Potassium.

Composition.—It consists of—
1 equivalent of Bromine...... = 78
1 ——— Potassium .... = 40
118

Bromine was discovered by M. Balard, of Montpelier, and was first described by that gentleman in the "Annales de Chim. et Physique" for August 1826. It is procured from the bittern of sea water, in which it probably exists as a hydrobromate of magnesia. It is a deep reddish-brown liquid, possessing an odour remarkably suffocating and disagreeable. Sp. gr. is estimated at 3. At common temperatures a brownish-red vapour is exhaled from it, and at 116° it boils rapidly. It becomes solidified at a little below 0°. It is sparingly soluble in water; more so in alcohol; and abundantly in æther. Like chlorine, it destroys vegetable colours; and so again in its vapour, as in that of chlorine, certain substances, as phosphorus, tin, &c. spontaneously inflame. It stains the skin yellow; it is poisonous. It may be detected by evaporating the water, so as to separate its more ordinary crystallizable contents, and dropping into the mother-liquor, reduced to a small bulk, a concentrated solution of chlorine. In the absence of iodine, which may be detected by starch, a yellow tint announces bromine.

Decomposition.—In preparing the bromide of potassium, bromine and iron filings are first added to a pint and a half of water; and a gentle heat is applied until the mixture acquires a greenish colour. In this stage, the bromine unites with the iron to form a bromide of iron. On the addition of the carbonate of potassa, the potassium of the potassa unites with the bromine to form a bromide of potassium; the oxygen with the iron to form an oxide of iron; and this last, with the carbonic acid, constitutes a protocarbonate of iron.



Properties.—Anhydrous, white, fusible, crystallizing in cubes, very soluble in water, and partially so in alcohol; colourless; inodorous; not decomposed by igneous fusion.

POTASSII IODIDUM.

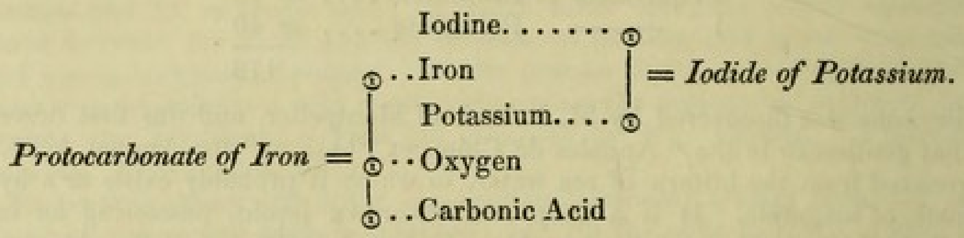
Iodide of Potassium.

(Hydriodate of Potassa.)

Composition.—It consists of—

1 equivalent of Iodine...........	=	126	or	76
1 ——— Potassium	=	40		24
		166		100

Decomposition.—The same diagrams and explanation will answer to this process as to the last.



Products.—Iodide of Potassium, and Protocarbonate of Iron.

Properties.—A crystalline compound, colourless, inodorous, and fusible. It is very soluble in water, 100 parts taking up 143 of this salt; sparingly soluble in absolute alcohol, but more so in alcohol of sp. gr. ·850; and in proof-spirit, sufficiently soluble for remedial purposes. "The crystals," says Mr. Brande, "ought not to be very deliquescent, and should perfectly dissolve in water."—*Vide* Tests.

LIQUOR POTASSII IODIDI COMPOSITUS.

Compound Liquor of Iodide of Potassium.

Composition.—Iodine dissolved in an aqueous solution of iodide of potassium.

Decomposition.—Simple solution, and not union in definite proportions, although it has been called an ioduretted iodide of potassium.

Properties.—Its colour is deep brown.

POTASSII SULPHURETUM.

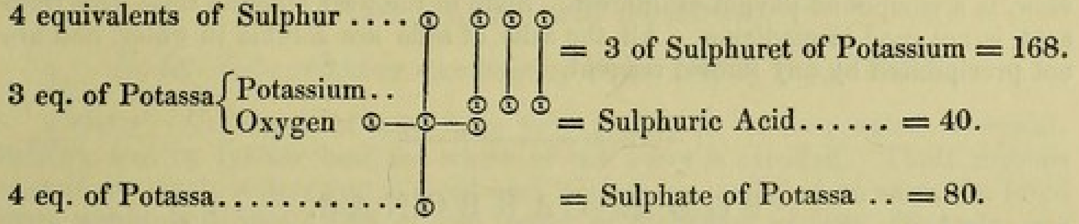
Sulphuret of Potassium.

Kali Sulphuratum, P. L. 1788.
Potassæ Sulphuretum, P. L. 1809, P. L. 1824.

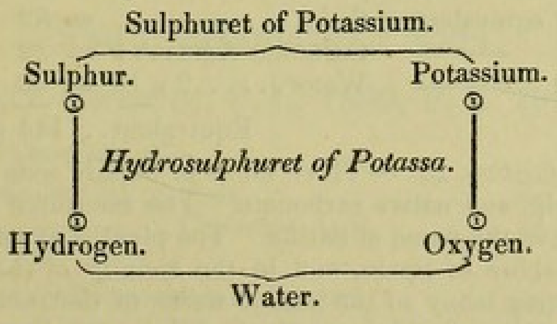
(Hepar Sulphuris.)

Composition.—3 equivalents of Sulphuret of Potassium.
1 equivalent of Sulphate of Potassa.

Decomposition.—4 equivalents of sulphur and 4 equivalents of carbonate of potassa (kali) are heated together, and the carbonic acid is expelled. An exchange takes place between part of the sulphur and the potassa; 3 sulphur with 3 potassium to form, as above, 3 equivalents of sulphuret of potassium; 3 corresponding equivalents of oxygen with the 4th equivalent of sulphur form sulphuric acid, which neutralizes the 4th undecomposed equivalent of potassa.



Properties. — Hard, reddish, or liver-brown substance, hence called liver of sulphur; odour, when moist, like that of rotten eggs; readily soluble in water; caustic taste; decomposed by exposure to the atmosphere, and gradually converted into sulphate of potassa. When dissolved, as in the form of lotion or bath, it decomposes water, and the sulphuret of potassium is converted into a hydrosulphuret of potassa. This compound never occurs but as the result of art.



Commentary.—When the student shall have duly learned the above theory of the reaction of the sulphur and potassium for the formation of liver of sulphur, he will no doubt be somewhat annoyed to find that according to later speculations it is stated to be a tersulphuret of potassium with sulphate of potassa. Thus—

"4 equivalents of potassa and 10 equivalents of sulphur, yield 3 equivalents of tersulphuret of potassium and 1 equivalent of sulphate of potassa."—TURNER's "Chemistry," page 440.

5 sulphurets of potassium are there enumerated—

1	eq. of Sulphur	+ 1	eq. of Potassium	=	Sulphuret of Potassium	eq. 56
2	——	+ 1	——	=	Bisulphuret of Potassium	.. 72
5	——	+ 1	——	=	Tersulphuret of Potassium	.. 88
3	——	+ 1	——	=	Quadrosulphuret of Potassium	104
4	——	+ 1	——	=	Quinosulphuret of Potassium	120

PRÆPARATA È SODIO.

Preparations of Sodium.

Sodium, the metallic base of soda, is a brilliant white metal, tarnishing by exposure to the atmosphere, in consequence of its attraction for oxygen. It has many of the properties of potassium. Like this last-mentioned metal, it decomposes water with the evolution of oxygen, and occasions a hissing noise; but without the usual phenomena of combustion, unless the water is hot, when it scintillates, or even inflames: its sp. gr. is 0·972; it fuses at 206° and rises in vapour at a red heat. It combines with oxygen in two proportions: 1 equivalent of sodium and 1 equivalent of oxygen to form soda; and 1½ of oxygen to 1 equivalent of sodium to form a sesquioxide of sodium, which, in a pharmaceutical view, is a compound devoid of interest. Soda in the pure alkaline state, free from acid, is not used in medicine. All the salts of soda are soluble in water, and are not precipitated by any known reagent.

SODÆ CARBONAS.

Carbonate of Soda.

Natron præparatum, P. L. 1788.
Sodæ Subcarbonas, P. L. 1809, P. L. 1824.

Composition.—1 equivalent of Soda............ = 32
1 ——— Carbonic Acid.... = 22
10 ——— Water......9 × 10 = 90
Equivalent.. 144 of the crystals.

Process of Purification, &c.—Three kinds of impure soda are met with in the market,—barilla, kelp, and native carbonate. The semifused ash of the *soda salsola* is imported under the name of barilla. The plant is extensively cultivated on the Mediterranean shore of Spain, and in the vicinity of the Alicant. Kelp is supplied by incinerating many of the marine weeds of the rocky coasts of Britain. These are burned in kilns, or in excavations of the ground, surrounded by stones. Kelp does not yield more than 5 per cent of carbonated alkali; and it takes, on an average, 24 tons of sea-weed to furnish 1 ton of kelp. The fucus digitatus, serratus, nodosus, and vesiculosus, or common sea-wrack, are the plants which yield most ash. With regard to the native carbonate, it constitutes but a small portion of the soda used in this country. All these specimens of the rough alkali require purification from the chloride of sodium, or chloride of potassium, contained in them; and this is effected by dissolving them in a small portion of water, filtrating the solution, and evaporating them at a gentle heat. Much, however, of the carbonate of soda now used in our own market is derived from the sulphate of soda, by a process of decomposition, which may be thus shortly described. The sulphate is ignited with chalk and charcoal; the sulphuric acid is driven off, and the soda combines with carbonic acid (to which end it is further exposed for some days in a damp cellar), yielding carbonate of soda.

Soda is itself divisible into sodium and oxygen. In 1807 it was shewn by Davy to consist of—

1 equivalent of Sodium.......... = 24
1 ——— Oxygen.......... = 8
32

Properties.—Carbonate of soda is colourless; inodorous; has an alkaline taste; and the usual alkaline reaction on vegetable colours, greening blues, and rendering vegetable yellows brown: the crystals contain 10 equivalents of water. It is soluble in twice its weight of water at 60°, and in less than its own weight at 212°. Exposed to a dry atmosphere its crystals effloresce, and crumble into an opaque white powder. In its anhydrous state it consists of—

1 equivalent of Soda .... = 32
1 ——— Carbonic Acid..... = 22
54

SODÆ CARBONAS EXSICCATA.

Dried Carbonate of Soda.

Sodæ Subcarbonas exsiccata, **P.L. 1809, P.L. 1824.**

Process.—Carbonate of soda fuses very readily in its own water of crystallization, and by further heat the whole of the water is expelled. These crystals contain so much water, that if a red heat were to be employed at once, the fused mass would boil over. Out of 100 grains of carbonate of soda, 62 grains are mere water. Hence, in prescribing the dried carbonate, as, for example, in pills with Castile soap, it will be recollected that 10 grains are equal to 25 grains of the crystals.

SODÆ SESQUICARBONAS.

Sesquicarbonate of Soda.

Sodæ Carbonas, **P. L. 1809, P. L. 1824.**

Composition.—It consists of—

1 equivalent of Soda................ = 32
1½ ——— Carbonic Acid........ = 33
65

The crystals contain 2 equivalents of water.

Decomposition.—A current of carbonic acid gas being transmitted through a solution of carbonate of soda, an additional half-equivalent of the carbonic acid unites with the base to form a sesquicarbonate; or, in other words, 2 equivalents of the carbonate attract an additional equivalent of carbonic acid to form 2 equivalents of the sesquicarbonate of soda.

Properties.—Colourless; inodorous; of an alkaline soapy taste; less soluble than the carbonate, and exciting but a slight alkaline reaction on vegetable colours. Exposed to a strong heat, it loses the additional half-equivalent of carbonic acid, and it is reduced to a dry carbonate of soda.

Commentary.—The sesquicarbonate of soda, the bicarbonate, and a mixture of both, are all sold indifferently under the shop-name of carbonate of soda, and it does not seem to occur either to the vendor or purchasers that any difference exists between the three articles.

SODÆ SULPHAS.

Sulphate of Soda.

Sal Catharticus Glauberi, **P. L. 1745.**
Natron Vitriolatum, **P. L. 1788.**
Sodæ Sulphas, **P. L. 1809, P. L. 1824.**

(Sal-Mirabile.)

Composition.—The crystals consist of—

1 equivalent of Soda.................. = 32
1 ——— Sulphuric Acid .... = 40
10 ——— Water ....9 × 10 = 90
Equivalent ...... = 162

Or, in the dry state,

		Wenzel.
1 equivalent of Soda	= 32	44·3
1 ——— Sulphuric Acid ..	= 40	55·7
	72	100

Decomposition.—The salt which remains after the distillation of hydrochloric acid is a sulphate of soda; but a slight excess of acid is present, which is here neutralized by the addition of a little carbonate of soda, the carbonic acid being expelled.

Properties.—Crystals efflorescent, having a strong bitter taste; soluble in 3 times its weight of water at 60°, and insoluble in alcohol. Exposed to heat, it undergoes watery fusion, melting in its own water of crystallization; and after the evaporation of its water, it may be again fused at a red heat.

SODÆ POTASSIO-TARTRAS.

Potassio-Tartrate of Soda.

Natron Tartarizatum, **P. L. 1788.**
Soda Tartarizata, **P. L. 1809, P. L. 1824.**

(Rochelle Salt, Sel de Seignette.)

Composition.—It is a double salt, consisting of—

1 equivalent of Tartrate of Potassa.... = 114
1 ——— Tartrate of Soda...... = 98
8 ——— Water.............. = 72
Equivalent.. 284

Or, 10 equivalents of water, according to Mr. Brande.

Decomposition.—Bitartrate of potassa contains 2 equivalents of tartaric acid and 1 of potassa. On adding the bitartrate to a solution of carbonate of soda, the soda combines with one of the equivalents of tartaric acid to form a tartrate of soda; and this, with the reduced neutral tartrate, constitutes the double salt, or potassio-tartrate of soda.

Properties.—Crystals prismatic; soluble in about 5 parts of cold water; colourless; devoid of smell, and having a bitter saline taste. They are very slowly affected by exposure to the air.

LIQUOR SODÆ EFFERVESCENS.

Effervescing Liquor of Soda.

(Soda Water.)

LIQUOR SODÆ CHLORINATÆ.

Liquor of Chlorinated Soda.

(Labarraque's Soda disinfecting Liquor.)

Composition.—Not determined. The late Dr. Turner conjectured it to be a compound of chloride of sodium and carbonate of soda.

Decomposition.—Under the article Calx Chlorinata, the student will find an explanation of the evolution of chlorine gas by the action of sulphuric acid upon a mixture of chloride of sodium and binoxide of manganese. It is first passed through five fluidounces of water to detach any hydrochloric acid that may be present, so as to employ pure chlorine. Dr. Turner speaks of the mixture as being necessarily attended with an escape of carbonic acid gas; but Mr. Brande states, that if the ingredients are employed in the proper proportions, no such escape occurs, which strongly confirms Dr. Turner's view of its composition. As the compound form is susceptible of crystallization, and the crystals, when redissolved, re-produce the disinfecting solution, it would seem more convenient to supply it in the state of crystals, with proper directions for its extemporaneous solution.

Properties.—A pale-yellow liquid, evolving chlorine when exposed to the air; its taste is sharp, saline, and astringent: it first reddens, and then decolorates turmeric. It is but little changed by a boiling heat: its disinfecting property depends (so it is conjectured) upon the tendency of the chlorine to unite with hydrogen, which is supposed to be an element of the matter of infection.

Preparation and Properties of Chlorine.—Chlorine was first described by Scheele in 1774. It may be obtained by mixing equal weights of black (per- or bin-) oxide of manganese and hydrochloric (muriatic) acid, and heating the mixture over a lamp in a glass retort. Two equivalents of the acid are decomposed; their 2 hydrogen uniting with 2 oxygen of the binoxide of manganese form 2 water, while 1 chlorine is evolved, and the second equivalent of chlorine unites with the manganese to form chloride of manganese. Chlorine at ordinary pressures and temperatures is a gaseous fluid; but, by the pressure of four atmospheres, Dr. Faraday succeeded in condensing it into the liquid form. It is of a greenish-yellow colour; odour, pungent and offensive; taste, acrid and astringent; irrespirable; or, if respired in small quantities diluted with air, it induces great irritation of the lungs, and spasm in the muscles of the larynx; 100 cubic inches weigh between 76 and 77 grains. Its sp. gr. in reference to air is 2·470, and in reference to hydrogen as 36 to 1. It is supposed to possess considerable bleaching properties, but these more probably depend on nascent oxygen, resulting from the decomposition of water. The bleaching power of dew is ascribed to some excess of oxygen, in the form of peroxide of hydrogen.

PRÆPARATA È ZINCO.

Preparations of Zinc.

Zinc is a bluish-white metal, possessing considerable lustre; of the sp. gr. of about 6·8, although in the state of zinc wire, it is as high as 7·2. At common temperatures, zinc is tough, and with difficulty broken by the hammer; but within a few degrees of its melting point, or 773°, if smartly struck, it is so brittle that it becomes granulated. Its equivalent is 32. Thenard, and others, have described a suboxide and a peroxide, but at present one definite compound is alone admitted, namely, the oxide of zinc of the present Pharmacopœia. In commerce, the impure metal is called spelter. It is procured either by fluxing calamine by means of charcoal, or by roasting zinc blende (sulphuret of zinc).

CALAMINA PRÆPARATA.

Prepared Calamine.

Calamina præparata, P. L. 1788, to P. L. 1824.

(Native Carbonate of Zinc.)

Composition.—Specimens from Somersetshire and Derbyshire yielded—

1 equivalent of Oxide of Zinc .... =	40	64·5
1 ——— Carbonic Acid .... =	22	35·5
	62	100

But most calamine abounds with ferruginous, earthy, and sometimes, as in the Matlock specimens, with cupreous impurities.

ZINCI OXYDUM.

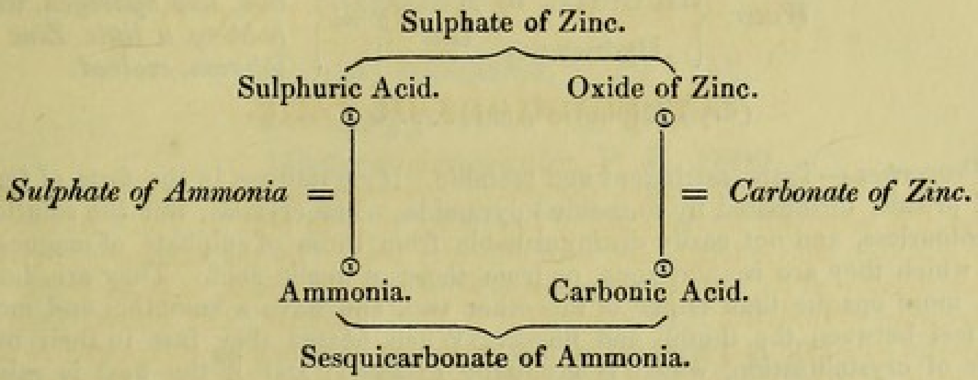
Oxide of Zinc.

Zincum Calcinatum, P. L. 1788.
Zinci Oxydum, P. L. 1809, P. L. 1824.

Composition.—It consists of—

		Proust.
1 equivalent of Zinc .... =	32	80
1 ——— Oxygen .... =	8	20
Equivalent	40	100

Decomposition.—Oxide of zinc is prepared by separately dissolving sulphate of zinc and sesquicarbonate of ammonia, and mixing the solutions. The exchange of acids and bases is reciprocal by double elective affinity, which the student will recognise by the perpendicular lines. We must infer that half an equivalent of carbonic acid escapes during the process.



Products.—Sulphate of ammonia in solution, carbonate of zinc precipitated; which last is afterwards reduced to the state of oxide by expelling the carbonic acid by means of heat.

Properties.—Oxide of zinc, when pure, is perfectly white, acquiring at a high temperature a tint of yellow, which it loses as it cools. It is inodorous, insipid, and insoluble in water, but readily soluble in acids and the caustic fixed alkalies. The oxide, prepared as above, has a slight tint of yellow. Eminent surgeons have stated that it does not agree with the skin and with ulcers, like the oxide prepared by combustion.

ZINCI SULPHAS.

Sulphate of Zinc.

Sal Vitrioli, P. L. 1720, P.L. 1745.
Zincum Vitriolatum, P. L. 1788.
Zinci Sulphas, P. L. 1809, P. L. 1824.

(White Vitriol, White Copperas.)

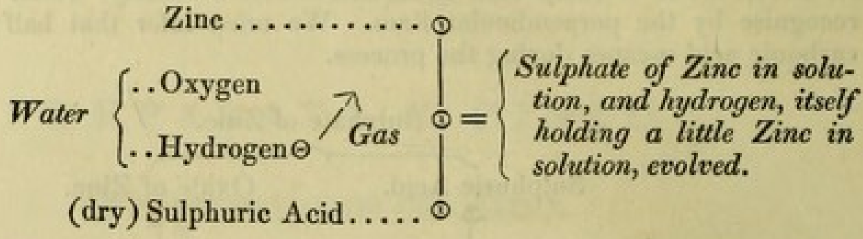
Composition.—It consists of—

		Tennant.
1 equivalent of Oxide of Zinc.....	= 40	50
1 ——— Sulphuric Acid....	= 40	50
Equivalents..	80	100

The crystals consist of—

1 equivalent of Anhydrous Sulphate of Zinc..	= 80	56
7 ——— Water.............. 9 × 7	= 63	44
Equivalents..	143	100

Decomposition.—Substituting zinc for iron, the chemical reactions are the same as those described under the head "Ferri Sulphas."—*Vide* page 82.



Properties.—Taste, astringent and metallic. It crystallizes in the form of four-sided prisms, terminated by four-sided pyramids. The crystals, like the solution, are colourless, and not easily distinguishable from those of sulphate of magnesia, with which they are isomorphous, or from those of oxalic acid. They are, however, more opaque than either of the other two, and have a smoother and more oily feel between the thumb and finger. When heated they fuse in their own water of crystallization, which is gradually expelled; and if the heat is raised very high, the sulphuric acid is also driven off, leaving an oxide of zinc. It is soluble in 2½ parts of water at 60°.

Though this salt is completely neutral, it reddens vegetable blue colours.

MISTURÆ.

Mixtures.

MISTURA ACACIÆ.

Mixture of Acacia [Gum Arabic].

Mucilago Arabici Gummi, P. L. 1788.
Mucilago Acaciæ, P. L. 1809, P. L. 1824.

MISTURA AMMONIACI.

Mixture of Ammoniacum.

Mistura Ammoniaci, P. L. 1809, P. L. 1824.

MISTURA AMYGDALÆ.

Mixture of Almond.

Emulsio communis, P. L. 1745.
Lac Amygdalæ, P. L. 1788.
Mistura Amygdalæ, P. L. 1809.
Mistura Amygdalarum, P.L. 1824.

MISTURA ASSAFŒTIDÆ.

Mixture of Assafœtida.

Lac Assafœtidæ, P. L. 1788.
Mistura Assafœtidæ, P. L. 1809, P. L. 1824.

MISTURA CAMPHORÆ.

Mixture of Camphor.

Julepum è Camphorâ, P. L. 1745.
Mistura Camphorata, P. L. 1788.
Mistura Camphoræ, P. L. 1809, P. L. 1824.

MISTURA CASCARILLÆ COMPOSITA.

Compound Mixture of Cascarilla.

MISTURA CRETÆ.

Mixture of Chalk.

Julepum è Cretâ, P. L. 1745.
Mistura Cretacea, P. L. 1788.
Mistura Cretæ, P. L. 1809, P. L. 1824.

MISTURA FERRI COMPOSITA.

Compound Mixture of Iron.

Mistura Ferri Composita, P. L. 1809, P. L. 1824.

Composition.—When recently prepared it contains sulphate of potassa in solution, and protocarbonate of iron in a state of partial suspension. In about two or three days it absorbs oxygen from the air, and becomes a reddish sesquioxide, in which state it is commonly rejected as too insoluble. This, however, is inconsistent; for the protoxide is also insoluble, and the sesquioxide, under the old name of subcarbonate of iron, is the favourite tonic for diseases of excessive mobility of the nervous system. They are both soluble in the natural acids of the stomach.

Decomposition.—Double elective affinity. The protoxide of iron attracts the carbonic acid to form a protocarbonate, the sulphuric acid unites with the potassa to form a sulphate of potassa.

MISTURA GENTIANÆ COMPOSITA.

Compound Mixture of Gentian.

MISTURA GUAIACI.

Mixture of Guaiacum.

Lac Guaiaci, P. L. 1788.
Mistura Guaiaci, P. L. 1809, P. L. 1824.

MISTURA MOSCHI.

Mixture of Musk.

Julepum è Moschâ, P. L. 1745.
Mistura Moschata, P. L. 1788.
Mistura Moschi, P. L. 1809, P. L. 1824.

MISTURA SPIRITÛS VINI GALLICI.

Mixture of Spirit of French Wine [Brandy].

OLEA DESTILLATA.

Distilled Oils.

THE general characters of essential oils, and the mode of detecting the spirit or fixed oil with which they may have been adulterated (the first by the milky opacity produced by the addition of water, and the last by the greasy stain left upon paper), have been already set forth in the Pharmacopœia. I am induced here to prefix an epitome of more recent discoveries, because these bodies have of late years been subjects of increasing interest, owing to the results afforded by their ultimate analysis. It has been already observed, that when distilled from their proper herbs with water, they pass over with it at the boiling-point, and the produce of the oil is said to be sometimes increased by adding salt to the water of the still, so as to elevate its boiling-point to the extent of a few degrees. The volatile oil is collected and separated from the water after distillation, by means of the Italian recipient and funnel. The epicarp of certain ikosandrious fruits, such as that of the lemon, the orange, and the bergamot, yields the oil simply by expression; but the volatile oil of seeds, herbs, and flowers, is mostly obtained by distillation. Sparingly soluble in water, their solutions are called distilled waters; largely soluble in alcohol, they thus constitute the essences of perfumers, whose business it is to study to develope the finest odours by a varied combination of the oils with certain other odoriferous materials. Moderate age improves the odour of most essential oils, but by long keeping some are concreted into a substance like spermaceti, and others absorb oxygen, and pass into the state of a thick resinous fluid. They are rapidly decomposed by the addition of nitric or sulphuric acid, and such additions to the oil of turpentine induce instant inflammation.

Some are binary compounds, or hydrocarbons; others are ternary, or oxides of hydrocarbon.

Of the first sort, are oil of turpentine, oil of lemons, and copaiva balsam, which are all three compounded of hydrogen and carbon. Most of the other essential oils belong to the second kind, or oxides of hydrocarbon; and with these may be ranked camphor, which has been shewn by Dumas to be an oxide of a hydrocarbon, identical in composition with pure oil of turpentine, and hence the new name of camphene, or camphogene, for this last fluid.

OLEUM ANISI.

Oil of Anise.

Oleum è seminibus Anisi, P. L. 1745.
Oleum essentiale Anisi, P. L. 1788.
Oleum Anisi, P. L. 1809, P. L. 1824.

OLEUM ANTHEMIDIS.

Oil of Chamomile.

Oleum Chamæmalinum, P. L. 1720.
Oleum è floribus Chamameli, P. L. 1745.
Oleum Anthemidis, P. L. 1788, P. L. 1809, P. L. 1824.

OLEUM CARUI.

Oil of Carraway.

Oleum essentiale è seminibus Carui, P. L. 1745.
Oleum essentiale Carui, P. L. 1788.
Oleum Carui, P. L. 1809, P. L. 1824.

OLEUM JUNIPERI.

Oil of Juniper.

Oleum essentiale è baccis Juniperi, P. L. 1720, P. L. 1745.
Oleum essentiale Juniperi baccæ, P. L. 1788.
Oleum Juniperi, P. L. 1809, P. L. 1824.

OLEUM LAVANDULÆ.

Oil of Lavender.

Oleum essentiale è floribus Lavendulæ, P. L. 1745.
Oleum essentiale Lavendulæ, P. L. 1788.
Oleum Lavandulæ, P. L. 1809, P. L. 1824.

OLEUM MENTHÆ PIPERITÆ.

Oil of Peppermint.

Oleum essentiale è foliis Menthæ piperitidis, P. L. 1745.
Oleum essentiale Menthæ piperitidis, P. L. 1788.
Oleum Menthæ piperitæ, P. L. 1809, P. L. 1824.

OLEUM MENTHÆ PULEGII.

Oil of Pennyroyal.

Oleum essentiale è foliis Pulegii, P. L. 1745.
Oleum essentiale Pulegii, P. L. 1788.
Oleum Pulegii, P. L. 1809, P. L. 1824.

OLEUM MENTHÆ VIRIDIS.

Oil of Spearmint.

Oleum essentiale è foliis Menthæ vulgaris, P. L. 1745.
Oleum essentiale Menthæ sativæ, P. L. 1788.
Oleum Menthæ viridis, P. L. 1809, P. L. 1824.

OLEUM ORIGANI.

Oil of Marjoram.

Oleum essentiale è foliis Origani, P. L. 1745.
Oleum essentiale Origani, P. L. 1788.
Oleum Origani, P. L. 1809, P. L. 1824.

OLEUM PIMENTÆ.

Oil of Pimenta.

Oleum Pimentæ, P. L. 1809, P. L. 1824.

OLEUM ROSMARINI.

Oil of Rosemary.

Oleum essentiale è foliis Roris marini, P. L. 1745.
Oleum essentiale Roris marini, P. L. 1788.
Oleum Rosmarini, P. L. 1809, P. L. 1824.

OLEUM SAMBUCI.

Oil of Elder Flowers.

OLEUM SUCCINI.

Oil of Amber.

Oleum Succini Rectificatum, P. L. 1788.
Oleum Succini, P. L. 1720, P. L. 1745, P. L. 1809, P. L. 1824.

OLEUM TEREBINTHINÆ PURIFICATUM.

Purified Oil of Turpentine.

(Also called Camphene and Camphogene.)

Oleum sive Spiritus Terebinthinæ, P. L. 1720.
Oleum Terebinthinæ Ætherеum, P. L. 1745.
Oleum Terebinthæ Rectificatum, P. L. 1788, P. L. 1809, P. L. 1824.

PILULÆ.

Pills.

PILULÆ ALOËS COMPOSITÆ.

Compound Pills of Aloes.

Pilulæ Aloës Compositæ, P. L. 1788, P. L. 1809, P. L. 1824.

PILULÆ ALOËS CUM MYRRHA.

Pills of Aloes with Myrrh.

Pilulæ Ruffi, P. L. 1720.
Pilulæ Rufi, P. L. 1745.
Pilulæ Aloës cum Myrrha, P. L. 1788, P. L. 1809, P. L. 1824.

PILULÆ CAMBOGIÆ COMPOSITÆ.

Compound Pills of Camboge.

Pilulæ Cambogiæ compositæ, P. L. 1809, P. L. 1824.

PILULÆ CONII COMPOSITÆ.

Compound Pills of Hemlock.

PILULÆ FERRI COMPOSITÆ.

Compound Pills of Iron.

Pilulæ Ferri cum Myrrhâ, P. L. 1809.
Pilulæ Ferri Compositæ, P. L. 1824.

Decomposition.—Substitute soda for potassa, and the theory will be the same as that of Griffiths' Mixture.—*Vide* Mist. Ferri Composita.

Commentary.—I often think of the mass of some two or three hundreds of these pills found on opening the bowels of a female who had died of amenorrhœal phthisis, (the autopsy was by Haller,) and I pause in prescribing these pills.

PILULÆ GALBANI COMPOSITÆ.

Compound Pills of Galbanum.

Pilulæ Gummosæ, P. L. 1720, P. L. 1745.
Pilulæ Galbani Compositæ, P. L. 1788, P. L. 1809, P. L. 1824.

PILULÆ HYDRARGYRI.

Pills of Mercury.

Pilulæ Mercuriales, P. L. 1745.
Pilulæ Hydrargyri, P. L. 1788, P. L. 1809, P. L. 1824.

Commentary.—I see no good reason for doubting that the mercury in this pill, as in the hydrargyrum cum cretâ, and unguentum hydrargyri, is partially oxidized. I have known considerable quantities of metallic mercury—a pound or more—remain for many hours in the alimentary canal, without any other effect than what was purely mechanical; and it may be added, that certain candidates for longevity have been known to swallow a globule of mercury, the size of a pea, or larger, every day of their lives, for a long series of years. But if any faith is to be placed on analyses, the exact proportion of oxidized and minutely divided metal was stated by Professor Brande twenty years ago, although the College authority tells us that blue pill is probably nothing but metallic mercury minutely divided.

PILULÆ HYDRARGYRI CHLORIDI COMPOSITÆ.

Compound Pills of Chloride of Mercury.

Pilulæ Hydrargyri Submuriatis compositæ, P. L. 1809, P. L. 1824.

PILULÆ HYDRARGYRI IODIDI.

Pills of Iodide of Mercury.

PILULÆ IPECACUANHÆ COMPOSITÆ.

Compound Pills of Ipecacuanha.

PILULÆ RHEI COMPOSITÆ.

Compound Pills of Rhubarb.

PILULÆ SAGAPENI COMPOSITÆ.

Compound Pills of Sagapenum.

PILULÆ SAPONIS COMPOSITÆ.

Compound Pills of Soap.

Laudanum, P. L. 1720.
Pilulæ Saponaceæ, P. L. 1745.
Pilulæ Opii, P. L. 1788.
Pilulæ Saponis cum Opio, P. L. 1809, P. L. 1824.

PILULÆ SCILLÆ COMPOSITÆ.

Compound Pills of Squill.

Pilulæ Scillæ, P.L. 1788.
Pilulæ Scillæ Compositæ, P. L. 1809, P. L. 1824.

PILULÆ STYRACIS COMPOSITÆ.

Compound Pills of Storax.

Pilulæ è Styrace, P. L. 1745.

PULVERES.

Powders.

PULVIS ALOËS COMPOSITUS.

Compound Powder of Aloes.

Pulvis Aloës cum Guaiaco, P. L. 1788.
Pulvis Aloës Compositus, P. L. 1809, P. L. 1824.

PULVIS CINNAMOMI COMPOSITUS.

Compound Powder of Cinnamon.

Species Aromaticæ, P. L. 1745.
Pulvis Aromaticus, P. L. 1788.
Pulvis Cinnamomi Compositus, P. L. 1809, P. L. 1824.

PULVIS CRETÆ COMPOSITUS.

Compound Powder of Chalk.

Pulvis è Bolo compositus sine Opio, Species è Scordio sine Opio, P. L. 1745.
Pulvis Cretæ compositus, P. L. 1788, P. L. 1809, P. L. 1824.

PULVIS CRETÆ COMPOSITUS CUM OPIO.

Compound Powder of Chalk with Opium.

Pulvis è Bolo compositus cum Opio, Species è Scordio cum Opio, P. L. 1745.
Pulvis è Cretâ compositus cum Opio, P. L. 1788, P. L. 1809, P. L. 1824.

PULVIS JALAPÆ COMPOSITUS.

Compound Powder of Jalap.

PULVIS IPECACUANHÆ COMPOSITUS.

Compound Powder of Ipecacuanha.

Pulvis Ipecacuanhæ Compositus, P. L. 1788, P. L. 1809, P. L. 1824.

PULVIS KINO COMPOSITUS.

Compound Powder of Kino.

Pulvis Kino compositus, P. L. 1809, P. L. 1824.

PULVIS SCAMMONII COMPOSITUS.

Compound Powder of Scammony.

Pulvis Comitis Warwicensis, P. L. 1720.
Pulvis è Scammonio compositus, P. L. 1745.
Pulvis Scammonii compositus, P. L. 1788, edit. altera.
Pulvis Scammoneæ compositus, P. L. 1809, P. L. 1824.

PULVIS TRAGACANTHÆ COMPOSITUS.

Compound Powder of Tragacanth.

Species Diatragacanthæ frigidæ, P. L. 1720.
Pulvis è Tragacanthâ compositus, P. L. 1745.
Pulvis Tragacanthæ compositus, P. L. 1788, P. L. 1809, P. L. 1824.

SPIRITUS.

Spirits.

ALCOHOL.

Alcohol.

Alcohol, P. L. 1788.
Alcohol, P. L. 1809, P. L. 1824.

Process.—In former Pharmacopœias the rectification of spirit was effected by kali previously heated, so as to increase its affinity for the water it was intended to separate. Pure well-burnt lime was, however, generally used in preference; and within the last few years chloride of calcium has been found to be a very effective agent for the separation of the water and the purification of the spirit. The operator should take care that the chloride is perfectly dry at the time of use.

Composition.—Alcohol is now considered to be a bihydrate of etherine. Within the last few years it was assumed to be a compound of—

1 equivalent of the Vapour of Water	.. =	9
1 ——— Olefiant Gas	...... =	14
Equivalent	..	23 for Alcohol.

But, according to the modern notion, its equivalent must be taken as 46, and it will consist of—

2 equivalents of Water	.... 9 × 2 =	18
1 ——— Etherine, Quadrihydrocarbon	...... =	28
Equivalent	..	46

In whichever light we view its constitution, the elements will accord with the analysis of Saussure:—

3 equivalents of Hydrogen..	3
2 ——— Carbon....	12
1 ——— Oxygen...	8
Equivalents ..	23 × 2 = 46.

Properties.—Absolute alcohol is a transparent, colourless liquid, of a pleasant odour, and a strong pungent taste. It is deservedly ranked among the poisons. It is lighter than water; its sp. gr. when obtained in the purest form, by rectification over lime, being ·791; but as it more usually occurs, it is ·820 at 60°. That of the Pharmacopœia is ·815; and it is seldom obtained of a lower specific gravity by the usual process of distillation. It has never been frozen. It is highly volatile and inflammable, and the products of combustion are water and carbonic acid. Alcohol, of sp. gr. of ·815 boils at 176°, or 36° below the boiling point of water. When mixed with water to form proof-spirit, much heat is evolved, and the mixed liquids occupy less space than that occupied by the alcohol and water, when separate.

SPIRITUS AMMONIÆ.

Spirit of Ammonia.

Spiritus Salis Ammoniaci, P. L. 1720.
Spiritus Salis Ammoniaci dulcis, P. L. 1745.
Spiritus Ammoniæ, P. L. 1788 to P. L. 1824.

Composition.—It is a spirituous solution of neutral carbonate of ammonia.

Decomposition.—*Vide* page 18, under the article ammoniæ sesquicarbonas. Hydrochlorate of ammonia and carbonate of potassa are dissolved in a mixture of spirit and water. The chlorine combines with the potassium to form chloride of potassium; the hydrogen of the hydrochloric acid, with the oxygen of the potassa, forms water; and the ammonia with the carbonic acid forms a neutral carbonate.

SPIRITUS AMMONIÆ AROMATICUS.

Aromatic Spirit of Ammonia.

Spiritus Salis Volatilis oleosus, P. L. 1720.
Spiritus Volatilis Aromaticus, P. L. 1745.
Spiritus Ammoniæ compositus, P. L. 1788.
Spiritus Ammoniæ Aromaticus, P. L. 1809, P. L. 1824.

Composition and *Decomposition.*—The same as those of spirit of ammonia.

SPIRITUS AMMONIÆ FŒTIDUS.

Fetid Spirit of Ammonia.

Spiritus Volatilis fœtidus, P. L. 1745.
Spiritus Ammoniæ fœtidus, P. L. 1788 to P. L. 1824.

Composition and *Decomposition.*—The same as those of spirit of ammonia.

SPIRITUS ANISI.

Spirit of Aniseed.

Spiritus Anisi, P. L. 1809, P. L. 1824.

Note.—The compound spirit of P. L. 1745 was prepared from equal weights of aniseed and angelica seed.

SPIRITUS ARMORACIÆ COMPOSITUS.

Compound Spirit of Horseradish.

Aqua Raphani composita, P. L. 1720, P. L. 1745.
Spiritus Raphani compositus, P. L. 1788.
Spiritus Armoraciæ compositus, P. L. 1809, P. L. 1824.

SPIRITUS CARUI.

Spirit of Carraway.

Aqua Seminum Carui, P. L. 1745.
Spiritus Carui, P. L. 1788, P. L. 1809, P. L. 1824.

SPIRITUS CINNAMOMI.

Spirit of Cinnamon.

Aqua Cinnamomi fortis, P. L. 1720.
Aqua Cinnamomi spirituosa, P. L. 1745.
Spiritus Cinnamomi, P. L. 1788, P. L. 1809, P. L. 1824.

SPIRITUS JUNIPERI COMPOSITUS.

Compound Spirit of Juniper.

Aqua Juniperi composita, P. L. 1745.
Spiritus Juniperi compositus, P. L. 1788, P. L. 1809, P. L. 1824.

SPIRITUS LAVANDULÆ.

Spirit of Lavender.

Spiritus Lavendulæ simplex, P. L. 1745.
Spiritus Lavendulæ, P. L. 1788.
Spiritus Lavandulæ, P. L. 1809, P. L. 1824.

SPIRITUS MENTHÆ PIPERITÆ.

Spirit of Peppermint.

Aqua Menthæ piperitidis spirituosa, P. L. 1745.
Spiritus Menthæ piperitidis, P. L. 1788.
Spiritus Menthæ piperitæ, P. L. 1809, P. L. 1824.

SPIRITUS MENTHÆ VIRIDIS.

Spirit of Spearmint.

Aqua Menthæ vulgaris spirituosa, P. L. 1745.
Spiritus Menthæ sativæ, P. L. 1788.
Spiritus Menthæ viridis, P. L. 1809, P. L. 1824.

SPIRITUS MENTHÆ PULEGII.

Spirit of Pennyroyal.

Aqua Pulegii spirituosa, P. L. 1745.
Spiritus Pulegii, P. L. 1788, P. L. 1809, P. L. 1824.

SPIRITUS MYRISTICÆ.

Spirit of Nutmeg.

Aqua Nucis Moschatæ, P. L. 1745.
Spiritus Myristicæ, P. L. 1788, P. L. 1809, P. L. 1824.

SPIRITUS PIMENTÆ.

Spirit of Pimenta.

Spiritus Pimento, P. L. 1788.
Spiritus Pimentæ, P. L. 1809, P. L. 1824.

SPIRITUS ROSMARINI.

Spirit of Rosemary.

Spiritus Rorismarini, **P. L. 1745, P. L. 1788.**
Spiritus Rosmarini, **P. L. 1809, P. L. 1824.**

SYRUPI.

Syrups.

SYRUPUS.

Syrup.

Syrupus simplex, **P. L. 1745.**
Syrupus, **P. L. 1788, P. L. 1809.**
Syrupus simplex, **P. L. 1824.**

SYRUPUS ALTHÆÆ.

Syrup of Marshmallow.

Syrupus de Althæâ, **P. L. 1720.**
Syrupus ex Althæâ, **P. L. 1745.**
Syrupus Althææ, **P. L. 1788, P. L. 1809, P. L. 1824.**

SYRUPUS AURANTII.

Syrup of Orange [Peel].

Syrupus de cortice Aurantiorum, **P. L. 1720.**
Syrupus è corticibus Aurantiorum, **P. L. 1745.**
Syrupus corticis Aurantii, **P. L. 1788.**
Syrupus Aurantii, **P. L. 1809.**
Syrupus Aurantiorum, **P. L. 1824.**

SYRUPUS CROCI.

Syrup of Saffron.

Syrupus Croci, P. L. 1720, P. L. 1745, P. L. 1788, P. L. 1809, P. L. 1824.

SYRUPUS LIMONUM.

Syrup of Lemons.

Syrupus è succo Citriorum, P. L. 1720.
Syrupus è succo Limonum, P. L. 1745.
Syrupus succi Limonum, P. L. 1788.
Syrupus Limonis, P. L. 1809.
Syrupus Limonum, P. L. 1824.

SYRUPUS MORI.

Syrup of Mulberry.

Syrupus Mororum, P. L. 1745.
Syrupus Mori, P. L. 1788, P. L. 1809, P. L. 1824.

SYRUPUS PAPAVERIS.

Syrup of Poppy.

Syrupus de Meconio sive Diacodium, P. L. 1720.
Syrupus de Meconio, P. L. 1745.
Syrupus Papaveris albi, P. L. 1788.
Syrupus Papaveris, P. L. 1809, P. L. 1824.

Mr. Bass has an excellent preparation, which he recommends as a substitute for the above. It is universally observed by the merest tyro of the shop, that the common syrup will not keep. A low temperature may retard, but does not prevent, fermentation. The mechanical inconvenience is certainly considerable;

but the deterioration in remedial power is a still greater defect. Mr. Bass observes, that the uncertainty in the strength of the recent syrup arises from the defective manner in which it is prepared, and the imperfect solution of the extractive matter. "I have lately (says this gentleman) brought forward a preparation for making syrup of poppy extemporaneously, which I think will entirely obviate the above inconveniences. My plan is to treat the bruised capsules with successive portions of boiling water, till the colouring matter is no longer given out. These solutions afterwards concentrated to a certain point, and combined with a small portion of alcohol, form a pure, permanent, and uniform preparation; one part of which, combined with four parts of simple syrup, will form syrup of poppy of great purity and of unvarying strength. As the simple syrup of the Pharmacopœia contains one-fifth part more sugar than the syrup of poppy, it follows that upon this plan the same proportions will continue to exist."

Neither this preparation, nor the syrup formed with it, are at all disposed to fermentation,—a quality which, with its uniformity of strength, render it, I think, well worthy the attention of medical practitioners.

An extemporaneous syrup of poppies may also be made by rubbing up a scruple of the Extractum Papaveris with one ounce of simple syrup; but the practice of making the Syrupus Sarsæ, and other syrups, in this way, is inexcusable.

SYRUPUS RHAMNI.

Syrup of Buckthorn.

Syrupus de Spinâ Cervinâ, P. L. 1720.
Syrupus è Spinâ Cervinâ, P. L. 1745.
Syrupus Spinæ Cervinæ, P. L. 1788.
Syrupus Rhamni, P. L. 1809, P. L. 1824.

SYRUPUS RHŒADOS.

Syrup of Red Poppy.

Syrupus de Papavere erratico, P. L. 1720.
Syrupus Papaveris erratici, P. L. 1745, P. L. 1788.
Syrupus Rhœados, P. L. 1809, P. L. 1824.

SYRUPUS ROSÆ.

Syrup of Rose.

Syrupus è Rosis siccis, P. L. 1720.
Syrupus Rosarum solutivus, P. L. 1745.
Syrupus Rosæ, P. L. 1788, P. L. 1809, P. L. 1824.

SYRUPUS SARZÆ.

Syrup of Sarsaparilla.

Syrupus Sarsaparillæ, **P. L. 1824.**

SYRUPUS SENNÆ.

Syrup of Senna.

Syrupus Sennæ, **P. L. 1809, P. L. 1824.**

SYRUPUS TOLUTANUS.

Syrup of Tolu.

Syrupus Balsamicus, **P. L. 1720, P. L. 1745.**
Syrupus Tolutanus, **P. L. 1788, P. L. 1809, P. L. 1824.**

SYRUPUS ZINGIBERIS.

Syrup of Ginger.

Syrupus Zingiberis, **P. L. 1745, P. L. 1788, P. L. 1809, P. L. 1824.**

TINCTURÆ.

Tinctures.

TINCTURA ALOËS.

Tincture of Aloes.

Tinctura Aloës, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA ALOËS COMPOSITA.

Compound Tincture of Aloes.

Elixir Proprietatis, P. L. 1720.
Elixir Aloës, P. L. 1745.
Tinctura Aloës composita, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA AMMONIÆ COMPOSITA.

Compound Tincture of Ammonia.

Spiritus Ammoniæ Succinatus, P. L. 1788, P. L. 1809, P. L. 1824.

Commentary.—This is a *tinctura non tincta*. It seems to have been named after the well-known figure of expression, *lucus à non lucendo*.

TINCTURA ASSAFŒTIDÆ.

Tincture of Assafœtida.

Tinctura Fœtida, P. L. 1745.
Tinctura Asæ fœtidæ, P L. 1788.
Tinctura Assafœtidæ, P. L. 1809, P. L. 1824.

TINCTURA AURANTII.

Tincture of Orange [Peel].

Tinctura corticis Aurantii, P. L. 1788.
Tinctura Aurantii, P. L. 1809, P. L. 1824.

TINCTURA BALSAMI TOLUTANI.

Tincture of Balsam of Tolu.

TINCTURA BENZÖINI COMPOSITA.

Compound Tincture of Benzoin.

Balsamum Traumaticum, P. L. 1745.
Tinctura Benzöes composita, P. L. 1788.
Tinctura Benzöini composita, P. L. 1809, P. L. 1824.

TINCTURA CALUMBÆ.

Tincture of Calumba.

Tinctura Colombæ, P. L. 1788.
Tinctura Calumbæ, P. L. 1809, P. L. 1824.

TINCTURA CAMPHORÆ.

Tincture of Camphor.

Spiritus Vini Camphoratus, P. L. 1720.
Spiritus vinosus Camphoratus, P. L. 1745.
Spiritus Camphoratus, P. L. 1788.
Spiritus Camphoræ, P. L. 1809, P. L. 1824.

TINCTURA CAMPHORÆ COMPOSITA.

Compound Tincture of Camphor.

Elixir Paregoricum, P. L. 1745.
Tinctura Opii Camphorata, P. L. 1788.
Tinctura Camphoræ composita, P. L. 1809, P. L. 1824.

TINCTURA CANTHARIDIS.

Tincture of Cantharides.

Tinctura Cantharidum, P. L. 1720, P. L. 1745.
Tinctura Cantharidis, P. L. 1788.
Tinctura Lyttæ, P. L. 1809.
Tinctura Cantharidis, P. L. 1824.

TINCTURA CAPSICI.

Tincture of Capsicum.

Tinctura Capsici, P. L. 1809, P. L. 1824.

TINCTURA CARDAMOMI.

Tincture of Cardamom.

Tinctura Cardamomi, P. L. 1745, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA CARDAMOMI COMPOSITA.

Compound Tincture of Cardamom.

Tinctura Stomachica, P. L. 1745.
Tinctura Cardamomi composita, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA CASCARILLÆ.

Tincture of Cascarilla.

Tinctura Cascarillæ, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA CASTOREI.

Tincture of Castor.

Tinctura Castorei, P. L. 1720, P. L. 1745, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA CATECHU.

Tincture of Catechu.

Tinctura Japonica, P. L. 1745.
Tinctura Catechu, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA CINCHONÆ.

Tincture of Cinchona [Yellow].

Tinctura Corticis Peruviani simplex, P. L. 1745.
Tinctura Cinchonæ, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA CINCHONÆ COMPOSITA.

Compound Tincture of Cinchona [Pale].

Tinctura Cinchonæ composita, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA CINNAMOMI.

Tincture of Cinnamom.

Tinctura Cinnamomi, P. L. 1745, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA CINNAMOMI COMPOSITA.

Compound Tincture of Cinnamom.

Tinctura Aromatica, P. L. 1745.
Tinctura Cinnamomi composita, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA COLCHICI.

Tincture of Meadow Saffron.

TINCTURA COLCHICI COMPOSITA.

Compound Tincture of Meadow Saffron.

Spiritus Colchici Ammoniatus, P. L. 1824.

TINCTURA CONII.

Tincture of Hemlock.

TINCTURA CUBEBÆ.

Tincture of Cubebs.

TINCTURA DIGITALIS.

Tincture of Foxglove.

Tinctura Digitalis, P. L. 1809, P. L. 1824.

TINCTURA GALLÆ.

Tincture of Gall.

TINCTURA GENTIANÆ COMPOSITA.

Compound Tincture of Gentian.

Tinctura Amara, P. L. 1745.
Tinctura Gentianæ composita, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA GUAIACI.

Tincture of Guaiacum.

Tinctura Guaiaci, P. L. 1809, P. L. 1824.

TINCTURA GUAIACI COMPOSITA.

Compound Tincture of Guaiacum.

Tinctura Guaiacina volatilis, P. L. 1745.
Tinctura Guaiaci Ammoniata, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA HELLEBORI [NIGRI].

Tincture of Hellebore.

Tinctura Hellebori, P. L. 1720.
Tinctura Melampodii, P. L. 1745.
Tinctura Hellebori nigri, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA HYOSCYAMI.

Tincture of Henbane.

Tinctura Hyoscyami, P. L. 1809, P. L. 1824.

TINCTURA JALAPÆ.

Tincture of Jalap.

Tinctura Jalapii, P. L. 1745, P. L. 1788.
Tinctura Jalapæ, P. L. 1809, P. L. 1824.

TINCTURA IODINII COMPOSITA.

Compound Tincture of Iodine.

TINCTURA KINO.

Tincture of Kino.

Tinctura Kino, P. L. 1809, P. L. 1824.

TINCTURA LAVANDULÆ COMPOSITA.

Compound Tincture of Lavender.

Spiritus Lavendulæ compositus Matthiæ, P. L. 1720.
Spiritus Lavendulæ compositus, P. L. 1745.
Tinctura Lavendulæ compositus, P. L. 1788.
Spiritus Lavandulæ compositus, P. L. 1809, P. L. 1824.

TINCTURA LUPULI.

Tincture of Hop.

Tinctura Humuli, P. L. 1809, P. L. 1824.

TINCTURA MYRRHÆ.

Tincture of Myrrh.

Tinctura Myrrhœ simplex, P. L. 1720.
Tinctura Myrrhæ, P. L. 1745, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA OPII.

Tincture of Opium.

Tinctura Opii, P. L. 1788, P. L. 1809, P. L. 1824.

Properties.—Colour, deep brown red, approaching to black; odour and taste of the opium. It strongly affects litmus paper; as also does Battley's sedative liquor, and Squire's solution of bimeconate of morphia. Ten minims of each of these preparations, separately diluted with an ounce of distilled water, were tested by the addition of a drop or two of tincture of iodine. The laudanum and the sedative liquor yielded a deep brickdust-precipitate; and a resinous pellicle, shewing the prismatic colours, was immediately found on the surface. The absence of the pellicle on the surface of Squire's solution would indicate that the resin is detached in his process of purification; the colour struck by the iodine was nearly the same in all three.

Commentary.—Proof-spirit is the best solvent of opium. There are many persons who still scarcely believe that the substitution of the rectified spirit was the error of the College, since no notice is taken of it in the (by permission) Collegiate Translation. It is almost impossible to bring such a work out without errors; but the practice of passing them over with "silent dignity" is inexcusable; nay, it is dishonest to the public.

TINCTURA RHEI COMPOSITA.

Compound Tincture of Rhubarb.

Tinctura Rhabarbari composita, P. L. 1788.
Tinctura Rhei composita, P. L. 1809, P. L. 1824.

TINCTURA SCILLÆ.

Tincture of Squill.

Tinctura Scillæ, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA SENNÆ COMPOSITA.

Compound Tincture of Senna.

Elixir Salutis, P. L. 1720.
Tinctura Sennæ, P. L. 1745, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA SERPENTARIÆ.

Tincture of Serpentary.

Tinctura Serpentariæ Virginianæ, P. L. 1720.
Tinctura Serpentariæ, P. L. 1745, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA VALERIANÆ.

Tincture of Valerian.

Tinctura Valerianæ simplex, P. L. 1745.
Tinctura Valerinæ, P. L. 1788, P. L. 1809, P. L. 1824.

TINCTURA VALERIANÆ COMPOSITA.

Compound Tincture of Valerian.

Tinctura Valerianæ volatilis, P. L. 1745.
Tinctura Valerianæ Ammoniatæ, P. L. 1788, P. L. 1809.
Tinctura Valerianæ Ammoniata, P. L. 1824.

TINCTURA ZINGIBERIS.

Tincture of Ginger.

Tinctura Zingiberis, P. L. 1788, P. L. 1809, P. L. 1824.

VINA.

Wines.

VINUM ALOËS.

Wine of Aloes.

Tinctura Hieræ, P. L. 1720.
Tinctura Sacra, P. L. 1745.
Vinum Aloës, P. L. 1788, P. L. 1809, P. L. 1824.

VINUM COLCHICI.

Wine of Meadow Saffron.

Vinum Colchici, P. L. 1824.

VINUM IPECACUANHÆ.

Wine of Ipecacuanha.

Vinum Ipecacoanhæ, P. L. 1745.
Vinum Ipecacuanhæ, P. L. 1788, P. L. 1809, P. L. 1824.

VINUM OPII.

Wine of Opium.

Laudanum liquidum Sydenhami, P. L. 1720.
Tinctura Thebaica, P. L. 1745.
Vinum Opii, P. L. 1809, P. L. 1824.

Commentary.—This aromatic vinous tincture is supposed to be of about the same strength as laudanum.

VINUM VERATRI.

Wine of White Hellebore.

Vinum Veratri, P. L. 1824.

UNGUENTA.

Ointments.

UNGUENTUM ANTIMONII POTASSIO-TARTRATIS.

Ointment of Potassio-tartrate of Antimony.

UNGUENTUM CANTHARIDIS.

Ointment of Cantharides.

Unguentum Cantharidis, P. L. 1824.

UNGUENTUM CETACEI.

Ointment of Spermaceti.

Linimentum album, P. L. 1745.
Unguentum Spermaceti, P. L. 1788.
Unguentum Cetacei, P. L. 1809, P. L. 1824.

UNGENTUM CREASOTI.

Ointment of Creasote.

Creasote, so called from *κρεάς* flesh, and *σωζω*, I preserve, from its antiseptic action on meat, was discovered by Reichenbach. It is procured by submitting wood tar to distillation, till the residue acquires the consistency of pitch. The peculiar odour and flavour of pyroligneous acid depends on the presence of this substance. This liquid is colourless, transparent, and somewhat oily in its consistence. It has a penetrating strong odour like that of smoked meat, and a burning acrid taste. Its sp. gr. is 1·037 at 65°; it boils at 397° and retains its fluidity at —17°. It is remarkable for its great refractive power, and a non-conductor of electricity. It burns with a sooty flame. When mixed with water, two solutions result, the one consisting of 1·25 creasote + 100 water; the other of 10 creasote + 100 water. The aqueous solution is neither acid nor alkaline. It is miscible also in all proportions with alcohol, æther, and naptha, but its most perfect solvent is acetic acid; in which form (properly diluted) it is an efficacious wash for milder cases of *tænia capitis*. Three or four drops added to a pint of ink, prevent its becoming mouldy. It exerts a powerful action on the animal system, and when applied externally undiluted, it destroys the epidermis. It combines with ammonia, lime, and baryta, and with certain of the elementary bodies, as chlorine, iodine, sulphur, phosphorus, &c.

It consists of (according to Ettling)—

Carbon	77·42
Hydrogen	8·12
Oxygen	14·46
	100

Commentary.—In addition to its having been used in various cutaneous diseases, it has been employed as a palliative in toothach; also to restrain vomiting, which, however, it frequently augments. It is a powerful stimulant to old ulcers, but its curative effects in cancer and other deep-seated organic diseases, are quite problematical. It should be kept in a close-stopped glass vessel, as it penetrates through cork, and imparts its peculiar odour to an entire apartment.

UNGUENTUM ELEMI.

Ointment of Elemi.

Unguentum è gummi Elemi sive Linimentum Arcæi, P. L. 1720.
Unguentum è gummi Elemi, P. L. 1745.
Unguentum Elemi compositum, P. L. 1788, P. L. 1809, P. L. 1824.

UNGUENTUM GALLÆ COMPOSITUM.

Compound Ointment of Galls.

UNGUENTUM HYDRARGYRI FORTIUS.

Stronger Ointment of Mercury.

Unguentum Cæruleum fortius, P. L. 1745.
Unguentum Hydrargyri fortius, P.L. 1788, P.L. 1809, P.L. 1824.

Process.—Under the process of rubbing, the mercury is partially oxidized, and the non-oxidized portion is intimately mixed with the lead. The College tell us, in their Translation, that the mercury is probably reduced to the same state as that in which it exists in the pilulæ hydrargyri; but under that head they tell us the mercury is probably not reduced at all: so that, according to their explanation, the mercury is probably reduced to the same state in this preparation to which it is not reduced in another! This is a passage well worthy of the critical acumen of their old acquaintance of 1814. *Absit invidia!* He has been very useful, both to them and to the public.

UNGUENTUM HYDRARGYRI MITIUS.

Milder Ointment of Mercury.

Unguentum Cœruleum mitius, P. L. 1745.
Unguentum Hydrargyri mitius, P. L. 1788, P. L. 1809, P. L. 1824.

UNGUENTUM HYDRARGYRI NITRATIS.

Ointment of Nitrate of Mercury.

Unguentum Hydrargyri Nitrati, P. L. 1788, P. L. 1809.
Unguentum Hydrargyri Nitratis, P. L. 1824.

Decomposition.—Mercury is dissolved in undiluted nitric acid; part of the acid is decomposed, and transferring 2 equivalents of oxygen to the mercury, converts it into a binoxide, with the escape of nitric-oxide gas; while the remaining acid uniting with this binoxide, forms a nitrate of binoxide of mercury.

UNGUENTUM HYDRARGYRI NITRICO-OXYDI.

Ointment of Nitric-oxide of Mercury.

Unguentum Hydrargyri Nitrico-Oxydi, P. L. 1809, P. L. 1824.

UNGUENTUM HYDRARGYRI IODIDI.

Ointment of Iodide of Mercury.

UNGUENTUM HYDRARGYRI BINIODIDI.

Ointment of Biniodide of Mercury.

UNGUENTUM HYDRARGYRI AMMONIO-CHLORIDI.

Ointment of Ammonio-chloride of Mercury.

Unguentum è Mercurio præcipitato albo, P. L. 1745.
Unguentum calcis Hydrargyri albæ, P. L. 1788.
Unguentum Hydrargyri præcipitati albi, P. L. 1809, P. L. 1824.

UNGUENTUM IODINII COMPOSITUM.

Compound Ointment of Iodine.

UNGUENTUM PICIS LIQUIDÆ.

Ointment of Liquid Pitch [Tar].

Unguentum è Pice, P. L. 1745.
Unguentum Picis, P. L. 1788.
Unguentum Picis Liquidæ, P. L. 1809, P. L. 1824.

UNGUENTUM PICIS NIGRÆ.

Ointment of Black Pitch.

Unguentum Basilicum nigrum, vel Tetrapharmacum, P. L. 1745.
Unguentum Picis Aridæ, P. L. 1809.
Unguentum Picis nigræ, P. L. 1824.

UNGUENTUM PLUMBI COMPOSITUM.

Compound Ointment of Lead.

UNGUENTUM PLUMBI IODIDI.

Ointment of Iodide of Lead.

UNGUENTUM SAMBUCI.

Ointment of Elder.

Unguentum Sambucinum, P. L. 1720, P. L. 1745.
Unguentum Sambuci, P. L. 1788, P. L. 1809, P. L. 1824.

UNGUENTUM SULPHURIS.

Ointment of Sulphur.

Unguentum è Sulphure, P. L. 1745.
Unguentum Sulphuris, P. L. 1788, P. L. 1809, P. L. 1824

UNGUENTUM SULPHURIS COMPOSITUM.

Compound Ointment of Sulphur.

Unguentum Sulphuris Compositum, P. L. 1809, P. L. 1824.

UNGUENTUM VERATRI.

Ointment of White Hellebore.

Unguentum Hellebori albi, P. L. 1788.
Unguentum Veratri, P. L. 1809, P. L. 1824.

UNGUENTUM ZINCI.

Ointment of Zinc.

Unguentum Zinci, P. L. 1809, P. L. 1824.

A TABLE

OF

ATOMIC OR EQUIVALENT WEIGHTS AND SYMBOLS

OF

SIMPLE OR ELEMENTARY SUBSTANCES.

	Atomic or Eq. W.	*Symbol.*
Aluminium	10	Al. or A.
Antimony	65	Sb. [Stibium.]
Arsenic	38	As.
Barium	68	Ba.
Bismuth	72	Bi.
Boron	20	B.
Bromine	78	Br.
Cadmium	56	Cd.
Calcium	20	Ca.
Carbon	6	C.
Cerium	48	Ce.
Chlorine	36	Cl.
Chromium	28	Cr.
Cobalt	30	Co. or Cb.
Columbium	185	Co. or Ta. [Tantalum.]
Copper	32	Cu. [Cuprum.]
Fluorine	18	F.
Glucinum	18	G.
Gold	200	Au. [Aurum.]
Hydrogen	1	H.
Iodine	126	I.
Iridium	98	Ir.
Iron	28	Fe. [Ferrum.]
Lead	104	Pb. [Plumbum.]
Lithium	8	L.
Magnesium	12	Mg.
Manganese	28	Mn.
Mercury	202	Hg. [Hydrargyrum.]
Molybdenum	48	Mo.
Nickel	28	Ni.
Nitrogen or Azote	14	N.
Osmium	100	Os.
Oxygen	8	O.
Palladium	54	Pd.
Phosphorus	16	P.
Platinum	98	Pt.
Potassium	40	K. [Kalium.]
Rhodium	52	R.
Selenium	40	Se.
Silicium or Silicon	8	Si.
Silver	108	Ag. [Argentum.]
Sodium	24	Na. [Natrium.]
Strontium	44	Sr.
Sulphur	16	S.
Tellurium	32	Te.
Thorium	60	Th.
Tin	58	Sn. [Stannum.]
Titanium	24	Ti.
Tungsten	100	Tu. or W. [Wolfram.]
Uranium	217	U.
Vanadium	68	V.
Yttrium	32	Y.
Zinc	32	Zn.
Zirconium	22	Zr.

A SECOND TABLE

OF

ATOMIC OR EQUIVALENT WEIGHTS AND SYMBOLS

OF

ELEMENTARY SUBSTANCES.

ARRANGED IN THE ORDER OF THEIR RELATIVE WEIGHTS, FOR ASSISTING THE MEMORY OF THE STUDENT.

	Atomic or Eq. W.	*Symbol.*
Hydrogen	1	H.
Carbon	6	C.
Lithium	8	L.
Oxygen	8	O.
Silicium or Silicon	8	Si.
Aluminium	10	Al. or A.
Magnesium	12	Mg.
Nitrogen or Azote	14	N.
Sulphur	16	S.
Phosphorus	16	P.
Fluorine	18	F.
Glucinum	18	G.
Calcium	20	Ca.
Boron	20	B.
Zirconium	22	Zr.
Sodium	24	Na. [Natrium.]
Nickel	28	Ni.
Cobalt	30	Co. or Cb.
Titanium	24	Ti.
Iron	28	Fe. [Ferrum.]
Manganese	28	Mn.
Chromium	28	Cr.
Tellurium	32	Te.
Zinc	32	Zn.
Copper	32	Cu. [Cuprum.]
Chlorine	36	Cl.
Yttrium	32	Y.
Arsenic	38	As.
Potassium	40	K. [Kalium.]
Selenium	40	Se.
Strontium	44	Sr.
Cerium	48	Ce.
Molybdenum	48	Mo.
Rhodium	52	R.
Palladium	54	Pd.
Cadmium	56	Cd.
Tin	58	Sn. [Stannum.]
Thorium	60	Th.
Antimony	65	Sb. [Stibium.]
Barium	68	Ba.
Vanadium	68	V.
Bismuth	72	Bi.
Bromine	78	Br.
Platinum	98	Pt.
Iridium	98	Ir.
Osmium	100	Os.
Tungsten	100	Tu. or W. [Wolfram.]
Lead	104	Pl. [Plumbum.]
Silver	108	Ag. [Argentum.]
Iodine	126	I.
Columbium	185	Co. or Ta. [Tantalum.]
Mercury	202	Hg. [Hydrargyrum.]
Gold	200	Au. [Aurum.]
Uranium	217	U.

TABLE III.

OF THE

DISCOVERY OF THE SIMPLE SUBSTANCES OR ELEMENTS, WITH THE SYMBOLS PREFIXED.

Element.	*Discoverer.*	*Year.*
S. Sulphur	Known to the Ancients.	
C. Carbon		
Au. Gold		
Ag. Silver		
Cu. Copper		
Fe. Iron		
Sn. Tin		
Pb. Lead		
Hg. Mercury		
Sb. Antimony	Basil Valentine, at the end of the 15th century.	
Zn. Zinc	Described by Agricola in 1529; first mentioned by Paracelsus.	
Bi. Bismuth	Traces of, in B. Valentine; first described by Agricola, in 1529.	
P. Phosphorus	Brandt	1669 1733
As. Arsenic		
Co. Cobalt		
Pt. Platinum	Wood	1741
Ni. Nickel	Cronstedt	1751
H. Hydrogen	Cavendish	1766
F. Fluorine	Scheele	1771
N. Nitrogen or Azote	Rutherford	1772
O. Oxygen	Priestley	1774
Cl. Chlorine	Scheele	1774
Mn. Manganese	Gahn and Scheele	1774
W. Tungsten	D'Elhuyart	1781
Mo. Molybdenum	Hielm	1782
Te. Tellurium	Müller	1782
U. Uranium	Klaproth	1789
Zr. Zirconium	Berzelius	1824
Ti. Titanium	Gregor	1791
Cr. Chronium	Vauquelin	1797
Y. Yttrium	Wöhler	1828
Ta. Columbium	Hatchett	1802
Pd. Palladium	Wollaston	1803
R. Rhodium		
Ir. Iridium	Descotils and Tennant	1803
Os. Osmium	Tennant	1803
Ce. Cerium	Hisinger and Berzelius	1804
B. Boron	Davy	1807
K. Potassium	Davy	1807
Na. Sodium		
Ba. Barium		
Sr. Strontium		
C. Calcium		
I. Iodine	Courtois	1811
Cd. Cadmium	Stromeyer	1818
Se. Selenium	Berzelius	1818
L. Lithium	Arfevedson	1818
Si. Silicium or Silicon	Berzelius	1824
Br. Bromine	Balaret	1826
G. Glucinium	Wöhler	1828
Th. Thorium	Berzelius	1828
Al. Aluminium	Wöhler	1828
Mg. Magnesium	Bussy	1829
V. Vanadium	Sefström	1830

A TABLE

REPRESENTING

THE COMPOSITION AND EQUIVALENTS

OF

COMPOUND SUBSTANCES.

Acid, Acetic (dry)	3 Hydrogen	=	3	51
	4 Carbon	=	24	
	3 Oxygen	=	24	
——, Glacial	1 Aq.			
——, Antimonious	1 Antimony	=	65	81
	2 Oxygen	=	16	
——, Antimonic	1 Antimony	=	65	85
	2½ Oxygen	=	20	
——, Arsenic	1 Arsenic	=	38	58
	2½ Oxygen	=	20	
——, Arsenious	1 Arsenic	=	38	50
	1½ Oxygen	=	12	
——, Benzoic	5 Hydrogen	=	5	113
	14 Carbon	=	84	
	3 Oxygen	=	24	
——, Benzoic (in crystals)	1 Dry Acid	=	113	122
	1 Aq.	=	9	
——, Boracic (dry)	1 Boron	=	20	68
	6 Oxygen	=	48	
——, Boracic (in crystals)	1 Dry Acid	=	68	122
	6 Aq.	=	54	
——, Bromic	1 Bromine	=	78	118
	5 Oxygen	=	40	
——, Carbonic	1 Carbon	=	6	22
	2 Oxygen	=	16	
——, Chloric	1 Chlorine	=	36	76
	5 Oxygen	=	40	
——, Chromic	1 Chromium	=	28	52
	3 Oxygen	=	24	
——, Citric (dry)	2 Hydrogen	=	2	58
	4 Carbon	=	24	
	4 Oxygen	=	32	
——, Citric (in crystals)	1 Dry Acid	=	58	70
	1⅓ Aq.	=	12	
——, Fluoric-hydro ?	1 Fluorine	=	18	19
	1 Hydrogen	=	1	

Acid, Gallic (dry)	3 Hydrogen	= 3	85
	7 Carbon	= 42	
	5 Oxygen	= 40	
——, Gallic (in crystals)	1 Dry Acid	= 85	94
	1 Aq.	= 9	
——, Hydriodic	1 Iodine	= 126	127
	1 Hydrogen	= 1	
——, Hydro-bromic	1 Bromine	= 78	79
	1 Hydrogen	= 1	
——, Hydro-chloric (dry)	1 Chlorine	= 36	37
	1 Hydrogen	= 1	
——, Hydro-cyanic (dry)	1 Cyanogen	= 26	27
	1 Hydrogen	= 1	
——, Hydro-sulphuric (gas)	1 Sulphur	= 16	17
	1 Hydrogen	= 1	
——, Hyponitrous	1 Azote	= 14	38
	3 Oxygen	= 24	
——, Hypo-phosphorous	2 Phosphorus	= 32	40
	1 Oxygen	= 8	
——, Hypo-sulphuric	2 Sulphur	= 32	72
	5 Oxygen	= 40	
——, Hypo-sulphurous	2 Sulphur	= 32	48
	2 Oxygen	= 16	
——, Meconic	2 Hydrogen	= 2	100
	7 Carbon	= 42	
	7 Oxygen	= 56	
——, Muriatic (*Vide* Acid Hydrochloric).			
——, Nitric (dry)	1 Azote	= 14	54
	5 Oxygen	= 40	
——, Nitric, sp. gr. 1·5 (liquid P. L.)	1 Dry Acid	= 54	67·5
	1½ Aq.	= 13·5	
——, Nitrous	1 Azote	= 14	46
	4 Oxygen	= 32	
——, Oxalic (dry)	2 Carbon	= 12	36
	3 Oxygen	= 24	
——, Oxalic (in crystals)	1 Dry Acid	= 36	63
	3 Aq.	= 27	
——, Oxichloric [Perchloric]	1 Chlorine	= 36	92
	7 Oxygen	= 56	
——, Phosphoric and Pyrophosphoric	1 Phosphorus	= 16	36
	2½ Oxygen	= 20	
——, Phosphorus	1 Phosphorus	= 16	28
	1½ Oxygen	= 12	
——, Selenious	1 Selenium	= 40	56
	2 Oxygen	= 16	
——, Selenic Acid	1 Selenium	= 40	64
	3 Oxygen	= 24	
——, Succinic (dry)	2 Hydrogen	= 2	50
	4 Carbon	= 24	
	3 Oxygen	= 24	
——, Succinic (in crystals)	1 Dry Acid	= 50	59
	1 Aq.	= 9	
——, Sulpho-vinic	2 Sulphuric Acid	= 80	126
	2 Alcohol	= 46	

Acid, Sulphuric (dry)	1 Sulphur	=	16	40
	3 Oxygen	=	24	
——, Sulphuric (liquid), sp. gr. 1·845	1 Dry Acid	=	40	49
	1 Aq.	=	9	
——, Sulphurous	1 Sulphur	=	16	32
	2 Oxygen	=	16	
——, Tartaric (dry)	2 Hydrogen	=	2	66
	4 Carbon	=	24	
	5 Oxygen	=	40	
——, —— (in crystals)	1 Dry Acid	=	66	75
	1 Aq.	=	9	
Æther (hyponitrous)	1 Hyponitrous Acid	=	38	75
	1 Æther	=	37	
——, Sulphuric	5 Hydrogen	=	5	37
	4 Carbon	=	24	
	1 Oxygen	=	8	
Æthereal Oil	1 Sulphuric Acid	=	40	77
	1 Æther	=	37	
Alcohol	3 Hydrogen	=	3	23
	2 Carbon	=	12	
	1 Oxygen	=	8	
Alum (P. L.) (Aluminæ and Potassæ Sulphas)	3 Sulphate of Alumina	=	174	487
	1 Sulphate of Potassa	=	88	
	25 Aq.	=	225	
Alumina	1 Aluminium	=	10	18
	1 Oxygen	=	8	
——, Sulphate of	1 Alumina	=	18	58
	1 Sulphuric Acid	=	40	
Ammonia	1 Azote	=	14	17
	3 Hydrogen	=	3	
——, Acetate of	1 Acetic Acid	=	51	68
	1 Ammonia	=	17	
——, Hydrated Bicarbonate of	2 Carbonic Acid	=	44	79
	1 Ammonia	=	17	
	2 Aq.	=	18	
——, Carbonate of	1 Carbonic Acid	=	22	39
	Ammonia	=	17	
——, Hydrated Sesquicarbonate of	1½ Carbonic Acid	=	33	59
	1 Ammonia	=	17	
	1 Aq.	=	9	
——, Hydrochlorate or Muriate	1 Ammonia	=	17	54
	1 Hydrochloric Acid	=	37	
——, Nitrate of	1 Ammonia	=	17	80
	1 Nitric Acid	=	54	
	1 Aq.	=	9	
——, Oxalate of	1 Ammonia	=	17	71
	1 Oxalic Acid	=	36	
	2 Aq.	=	18	
——, Phosphate of	1 Ammonia	=	17	71
	1 Phosphoric Acid	=	36	
	2 Aq.	=	18	
——, Sulphate of	1 Ammonia	=	17	75
	1 Sulphuric Acid	=	40	
	2 Aq.	=	18	

Antimony, Oxysulphuret of	1 Sesquioxide of Antimony	77	594
	5 Sesquisulphuret of Antimony	445	
	8 Aq.	72	
———, Potassio-tartrate of	1 Tartrate of Potassa	114	361
	1 Ditartrate of Antimony	220	
	3 Aq.	27	
———, Sesquioxide of	1 Antimony	65	77
	1½ Oxygen	12	
———, Sesquisulphuret of	1 Antimony	65	89
	1½ Sulphur	24	
Azote, Protoxide of	1 Azote	14	22
	1 Oxygen	8	
——, Bin- or Deutoxide of	1 Azote	14	30
	2 Oxygen	16	
——, 3 Oxide of (*Vide* Acid Hyponitrous).			
——, 4 Oxide of (*Vide* Acid Nitrous).			
——, 5 Oxide of (*Vide* Acid Nitric).			
——, Bicarburet of (Cyanogen)	2 Carbon	12	26
	1 Azote	14	
——, Chloride of	1 Nitrogen	14	158
	4 Chlorine	144	
Barium, Chloride of (in crystals)	1 Barium	68	122
	1 Chlorine	36	
	2 Aq.	18	
Barytes	1 Barium	68	76
	1 Oxygen.	8	
———, Carbonate of	1 Barytes	76	98
	1 Carbonic Acid	22	
———, Nitrate of	1 Barytes	76	130
	1 Nitric Acid	54	
———, Sulphate of	1 Barytes	76	116
	1 Sulphuric Acid	40	
Bismuth, Oxide of	1 Bismuth	72	80
	1 Oxygen	8	
———, Trismitrate of	3 Oxide of Bismuth	240	294
	1 Nitric Acid	54	
Calcium, Chloride of	1 Calcium	20	56
	1 Chlorine	36	
———, Oxide of (Lime)	1 Calcium	20	28
	1 Oxygen	8	
Carbon, Oxide of (Carbonic Oxide)	1 Carbon	6	14
	1 Oxygen	8	
Cinchonia	C 20 Carbon	120	154
	H 12 Hydrogen	12	
	A 1 Azote	14	
	O 1 Oxygen	8	
Copper, Acetate of (in crystals)	1 Oxide of Copper	40	100
	1 Acetic Acid	51	
	1 Aq.	9	
———, Diacetate of (in crystals)	2 Oxide of Copper	80	185
	1 Acetic Acid	51	
	6 Aq.	54	
———, Dioxide of	2 Copper	64	72
	1 Oxygen	8	

Copper, Protoxide	1 Copper	= 32	40
	1 Oxygen	= 8	
———, Sulphate of (in crystals)	1 Protoxide of Copper	= 40	125
	1 Sulphuric Acid	= 40	
	5 Aq.	= 45	
Cyanogen	1 Azote	= 14	26
	2 Carbon	= 12	
Ethereum, or Ethule	5 Hydrogen	= 5	29
	4 Carbon	= 24	
Hydrogen, Arseniuretted	1 Arsenic	= 38	39·5
	1½ Hydrogen	= 1·5	
———, Carburetted (light bihydroguret of)	1 Carbon	= 6	8
	2 Hydrogen	= 2	
———, Bicarburetted (heavy) (bihydrocarbon olefiant gas)	2 Carbon	= 12	14
	2 Hydrogen	= 2	
———, Bicarburet of (*Faraday's*)	6 Carbon	= 36	39
	3 Hydrogen	= 3	
———, Quadrihydrocarburet (Etherine)	4 Carbon	= 24	28
	4 Hydrogen	= 4	
———, Sexto-carburetted (Naptha)	6 Carbon	= 36	42
	6 Hydrogen, or 5	= 6	
——— 10 to 4 Carburetted or Napthaline	10 Carbon	= 60	64
	4 Hydrogen	= 4	
———, Oxide of, (or water) Aq.	1 Oxygen	= 8	9
	1 Hydrogen	= 1	
———, Peroxide of	1 Hydrogen	= 1	17
	2 Oxygen	= 16	
——— Phosphuretted	1 Phosphorus	= 16	17·5
	1½ Hydrogen	= 1·5	
——— Seleniuretted	1 Selenium	= 40	41
	1 Hydrogen	= 1	
———, Sulphuretted (*Vide* Acid Hydrosulphuric).			
———, Bisulphuretted, or Bisulphuret of	2 Sulphur	= 32	33
	1 Hydrogen	= 1	
Iron, Bromide of	1 Iron	= 28	106
	1 Bromine	= 78	
———, Iodide of	1 Iron	= 28	199
	1 Iodine	= 126	
	5 Water	= 45	
———, Percyanide of (Prussian Blue)	7 Iron	= 196	430
	9 Cyanogen	= 234	
———, Potassio-tartrate of	1 Tartrate of Potassa	= 114	220
	1 Tartrate of Sesquioxide of Iron	= 106	
———, Chloride (Prot.) of	1 Iron	= 28	64
	1 Chlorine	= 36	
———, Sesquichloride of	1 Iron	= 28	82
	1½ Chlorine	= 54	
———, Oxide (Prot.) of	1 Iron	= 28	36
	1 Oxygen	= 8	
———, Sesquioxide of	1 Iron	= 28	40
	1½ Oxygen	= 12	
———, Sulphate of (in crystals)	1 Protoxide of Iron	= 36	139
	1 Sulphuric Acid	= 40	
	7 Aq.	= 63	

Lead, Acetate of	1 Protoxide of Lead	= 112	190
	1 Acetic Acid	= 51	
	3 Aq.	= 27	
——, Carbonate of	1 Protoxide of Lead	= 112	134
	1 Carbonic Acid	= 22	
——, Chloride of	1 Lead	= 104	140
	1 Chlorine	= 36	
——, Oxide (Prot.) of, or Massicot	1 Lead	= 104	112
	1 Oxygen	= 8	
——, Deutoxide of (Red Lead)	3 Lead	= 312	344
	4 Oxygen	= 32	
——, Peroxide, Brown Binoxide	1 Lead	= 104	120
	2 Oxygen	= 16	
——, Dinoxide, or Suboxide	2 Lead	= 208	216
	1 Oxygen	= 8	
Lime (*Vide* Calcium, Oxide of).			
——, Acetate of	1 Lime	= 28	79
	1 Acetic Acid	= 51	
——, Carbonate of	1 Lime	= 28	50
	1 Carbonic Acid	= 22	
——, Chlorinated	2 Lime	= 56	110
	1 Chlorine	= 36	
	2 Aq.	= 18	
——, Citrate of	1 Lime	= 28	95
	1 Citric Acid	= 58	
	1 Aq.	= 9	
——, Hydrate of	1 Lime	= 28	37
	1 Aq.	= 9	
——, Phosphate of	1 Lime	= 28	64
	1 Phosphoric Acid	= 36	
——, Subsesquiphosphate (Bone Earth)	1½ Lime	= 42	78
	1 Phosphoric Acid	= 36	
——, Sulphate of	1 Lime	= 28	68
	1 Sulphuric Acid	= 40	
—— Sulphate (in crystals)	1 Sulphate of Lime	= 68	86
	2 Aq.	= 18	
——, Tartrate of	1 Lime	= 28	130
	1 Tartaric Acid	= 66	
	4 Water	= 36	
Magnesia	1 Magnesium	= 12	20
	1 Oxygen	= 8	
——, Carbonate of	1 Magnesia	= 20	42
	1 Carbonic Acid	= 22	
——, Carbonate of (P.L.) Hydrated	5 Magnesia	= 100	242
	4 Carbonic Acid	= 88	
	6 Aq.	= 54	
——, Sulphate of (crystals)	1 Magnesia	= 20	123
	1 Sulphuric Acid	= 40	
	7 Aq.	= 63	
Magnesium, Chloride of	1 Magnesium	= 12	48
	1 Chlorine	= 36	
Manganese, Chloride of	1 Manganese	= 28	64
	1 Chlorine	= 36	
——, Oxide of (Prot.)	1 Manganese	= 28	36
	1 Oxygen	= 8	

Manganese, Binoxide of (Per.)	1 Manganese	= 28	44
	2 Oxygen	= 16	
———, Sesquioxide, (Deut.)	1 Manganese	= 28	40
	1½ Oxygen	= 12	
Mercury, Chloride of (Prot.)	1 Mercury	= 202	238
	1 Chlorine	= 36	
———, Bichloride of (Per. or Deuto)	1 Mercury	= 202	274
	2 Chlorine	= 72	
———, Ammonio - Chloride of	Disputed.		
———, Bicyanide of	1 Mercury	= 202	254
	2 Cyanogen	= 52	
———, Iodide of (Prot)	1 Mercury	= 202	328
	1 Iodine	= 126	
———, Biniodide of (Per.)	1 Mercury	= 202	454
	2 Iodine	= 252	
———, Oxide of (Prot.)	1 Mercury	= 202	210
	1 Oxygen	= 8	
———, Binoxide of (Per.)	1 Mercury	= 202	218
	2 Oxygen	= 16	
———, Nitrate of	1 Oxide of Mercury	= 210	264
	1 Nitric Acid	= 54	
———, Bipernitrate of	1 Binoxide of Mercury	= 218	326
	2 Nitric Acid	= 108	
———, Sulphate of	1 Oxide of Mercury	= 210	250
	1 Sulphuric Acid	= 40	
———, Bipersulphate of	1 Binoxide of Mercury	= 218	298
	2 Sulphuric Acid	= 80	
———, Sulphuret of	1 Mercury	= 202	218
	1 Sulphur	= 16	
———, Bisulphuret of	1 Mercury	= 202	234
	2 Sulphur	= 32	
Molybdenum, Oxide of (Prot.)	1 Molybdenum	= 48	56
	1 Oxygen	= 8	
———, Binoxide of	1 Molybdenum	= 48	64
	2 Oxygen	= 16	
———, Peroxide (Molyb. Acid.)	1 Molybdenum	= 48	72
	3 Oxygen	= 24	
Morphia (dry)	34 Carbon ... 6 × 34	= 204	284
	18 Hydrogen ... 1 × 18	= 18	
	1 Azote	= 14	
	6 Oxygen ... 8 × 6	= 48	
———, (in crystals)	1 Dry Morphia	= 284	302
	2 Aq.	= 18	
———, Acetate of	1 Morphia	= 284	335
	1 Acetic Acid	= 51	
———, Hydrochlorate of (Muriate)	1 Morphia	= 284	374
	1 Hydrochloric Acid	= 36	
	6 Aq.	= 54	
Potassa (Potash) dry (Hydrate of, 1 Aq.)	1 Potassium	= 40	48
	1 Oxygen	= 8	
———, Acetate of	1 Potassa	= 48	99
	1 Acetic Acid	= 51	
———, Arsenite of	1 Potassa	= 48	98
	1 Arsenious Acid	= 50	

Potassa, Arseniate of	1 Potassa	= 48	106
	1 Arsenic Acid	= 58	
———, Binarseniate of	1 Potassa	= 48	164
	2 Arsenic Acid	= 116	
———, Carbonate of (dry)	1 Potassa	= 48	70
	1 Carbonic Acid	= 22	
———, Carbonate (P.L.)	1 Potassa	= 48	83·5
	1 Carbonic Acid	= 22	
	1½ Aq.	= 13·5	
———, Bicarbonate of (crystals)	1 Potassa	= 48	101
	2 Carbonic Acid	= 44	
	1 Aq.	= 9	
———, Chlorate of	1 Potassa	= 48	124
	1 Chloric Acid	= 76	
———, Chromate of	1 Potassa	= 48	100
	1 Chromic Acid	= 52	
———, Citrate of (dry)	1 Potassa	= 48	106
	1 Citric Acid	= 58	
———, Nitrate of (Nitre)	1 Potassa	= 48	102
	1 Nitric Acid	= 54	
———, Oxalate of (crystals)	1 Potassa	= 48	93
	1 Oxalic Acid	= 36	
	1 Aq.	= 9	
———, Sulphate of	1 Potassa	= 48	88
	1 Sulphuric Acid	= 40	
———, Bisulphate of	1 Potassa	= 48	146
	2 Sulphuric Acid	= 80	
	2 Aq.	= 18	
———, Tartrate of (crystals, 1 Aq.)	1 Potassa	= 48	114
	1 Tartaric Acid	= 66	
———, Bitartrate of	1 Potassa	= 48	189
	2 Tartaric Acid	= 132	
	1 Aq.	= 9	
Potassium, Bromide of	1 Potassium	= 40	118
	1 Bromine	= 78	
———, Chloride of	1 Potassium	= 40	76
	1 Chlorine	= 36	
———, Ferrocyanide of (crystals)	1 Cyanide of Iron	= 54	213
	2 Cyanide of Potassa	= 132	
	3 Aq.	= 27	
———, Iodide	1 Potassium	= 40	166
	1 Iodine	= 126	
———, Oxide of (*Vide* Potassa, dry).			
———, Peroxide of	1 Potassium	= 40	64
	3 Oxygen	= 24	
———, Sulphuret of	1 Potassium	= 40	56
	1 Sulphur	= 16	
Quina	20 Carbon	= 120	162
	12 Hydrogen	= 12	
	1 Azote	= 14	
	2 Oxygen	= 16	
———, Sulphate of	1 Quina	= 162	274
	1 Sulphuric Acid	= 40	
	8 Water	= 72	

Quina, Disulphate of	2 Quina	= 324	436
	1 Sulphuric Acid	= 40	
	8 Water	= 72	
Rhodium, Oxide (Prot.) of.	Not yet insulated.		
——— Binoxide	2 Rhodium	= 104	128
	3 Oxygen	= 24	
Silica	1 Silicium	= 8	16
	1 Oxygen	= 8	
Silver, Chloride of	1 Silver	= 108	144
	1 Chlorine	= 36	
——, Cyanide of	1 Silver	= 108	134
	1 Cyanogen	= 26	
——, Iodide of	1 Silver	= 108	234
	1 Iodine	= 126	
——, Oxide of	1 Silver	= 108	116
	1 Oxygen	= 8	
——, Nitrate of	1 Oxide of Silver	= 116	170
	1 Nitric Acid	= 54	
Soda	1 Sodium	= 24	32
	1 Oxygen	= 8	
——, Acetate of	1 Soda	= 32	137
	1 Acetic Acid	= 51	
	6 Aq.	= 54	
——, Borate of (cryst. 10 Aq.)	1 Soda	= 32	100
	1 Boracic Acid	= 68	
——, Carbonate of (dry)	1 Soda	= 32	54
	1 Carbonic Acid	= 22	
——, Bicarbonate of	1 Soda	= 32	85
	2 Carbonic Acid	= 44	
	1 Aq.	= 9	
——, Sesquicarbonate of	1 Soda	= 32	83
	1½ Carbonic Acid	= 33	
	2 Water	= 18	
——, Citrate (dry)	1 Soda	= 32	90
	1 Citric Acid	= 58	
——, Hydrate of	1 Soda	= 32	41
	1 Aq.	= 9	
——, Phosphate of (cryst. 12 Aq.)	1 Soda	= 32	68
	1 Phosphoric Acid	= 36	
——, Potassio-tartrate of (Rochelle Salt)	1 Tartrate of Potassa	= 114	284
	1 Tartrate of Soda	= 98	
	8 Aq.	= 72	
——, Sulphate of (crystal. 10 Aq.)	1 Soda	= 32	72
	1 Sulphuric Acid	= 40	
——, Tartrate of	1 Soda	= 32	98
	1 Tartaric Acid	= 66	
Sodium, Chloride of	1 Sodium	= 24	60
	1 Chlorine	= 36	
———, Iodide of	1 Sodium	= 24	150
	1 Iodine	= 126	
———, Oxide of (*Vide* Soda).			
———, Peroxide of	2 Sodium	= 48	72
	3 Oxygen	= 24	
Strontia	1 Strontium	= 44	52
	1 Oxygen	= 8	

Strychnia	30 Carbon	6 × 30 =	180	234
	16 Hydrogen	1 × 16 =	16	
	1 Azote	=	14	
	3 Oxygen	8 × 3 =	24	
Veratria	34 Carbon	6 × 34 =	204	288
	22 Hydrogen	1 × 22 =	22	
	1 Azote	=	14	
	6 Oxygen	8 × 6 =	48	
Water	1 Hydrogen	=	1	9
	1 Oxygen	=	8	
Zinc, Chloride of	1 Zinc	=	32	68
	1 Chlorine	=	36	
——, Carbonate of	1 Oxide of Zinc	=	40	71
	1 Carbonic Acid	=	22	
	1 Aq.	=	9	
——, Oxide of	1 Zinc	=	32	40
	1 Oxygen	=	8	
——, Sulphate of (crys. 7 Aq.)	1 Oxide of Zinc	=	40	80
	1 Sulphuric Acid	=	40	
Zirconia	1 Zirconium	=	22	30
	1 Oxygen	=	8	

SYMBOLS.

The symbols* for the simple elements have already been given. As they are in general use, and as they are rendered almost indispensable by the multiplication of the minute facts of chemistry (which, by the exertions of the chemists of successive generations, bid fair to swell out beyond the grasp of human memory), it is to be regretted that, for the sake of uniformity, writers do not adopt some universal code for formulæ, as they are called. It is our present business to give a few examples of their use.

Primary Use.—Looking to the symbols of the 54 elements, the student will see that the letters O, C, Hg, stand for 1 equivalent of Oxygen, 1 equivalent of Carbon, 1 equivalent of Mercury. Figures prefixed will represent two or more equivalents of these elements; as, for example, $2\,O$, $2\,C$, or 2 equivalents of Oxygen, 2 equivalents of Carbon. The Algebraic sign + intervening between the symbols denotes their union, as $Hg + O$ for a single equivalent of oxide of Mercury, $K + O$ for a single equivalent of potassa, and so on.

Secondary or Compound Use.—To indicate Nitrate of Potassa, the formula which first presents itself would be $K + N + 6\,O$; or 1 Potasssa, 1 Azote, 6 Oxygen. But this would be imperfect, since it would fail to shew that of the 6 equivalents of Oxygen, 5 are in the Nitric Acid and 1 in the Potassa. This is remedied by placing the symbols thus $(K + O) + (N + 5\,O)$, the symbols of those elements which are inferred to be united being contained in brackets.

Further Compound Use.—By placing any number on the outside of a bracket, the compound within it is multiplied. For example, $(K + O) + 2\,(S + 3\,O)$ indicates bisulphate of potassa.

These figures are often raised to the right hand of the symbol, as $N\,O^5$ for Nitric Acid, *i. e.* Quintoxide of Nitrogen or Azote; $N\,H^3$ for Ammonia; $N\,C^2$ for Cyanogen, &c., in which Berzelius dispenses with the sign +, and writes combined elements side by side, the sign of addition being understood though not expressed. So again the same author indicates degrees of oxidization, by dots placed over the symbol, writing $\dot{K}$ for Potassa, $\ddot{C}$ for Carbonic Acid, $\dot{N}$ for Protoxide of Azote; instead of $K + O$, $C + 2\,O$, $N + O$. When the ratio is that of 2 to 3, he employs a dash placed below, as the symbol for two equivalents; thus $\underline{\dddot{Fe}}$ is used instead of $2\,Fe + 3\,O$.

These are examples of the most familiar and direct use of symbols; and for the varieties in the mode adopted in their application (suggested by Berzelius and others) the reader is referred to Turner's "Chemistry," page 238, edition 1837.

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* In the Second Table of the Elements, Titanium is misplaced; it ought to stand between Sodium and Nickel.

OF

POISONS:

THEIR

EFFECTS, ANTIDOTES, AND TESTS.

ARSENIC, White Oxide of, or Arsenious Acid.—The properties of this virulent poison have already been described at page 68.

Symptoms.—About half an hour after it has been swallowed—although sometimes, but rarely, after a few minutes; and sometimes, but still more rarely, after a few hours—the effects become manifest by a sense of sickness and burning pain in the region of the stomach, augmented by pressure. To these accede violent vomiting or dry retching, with ineffectual efforts to vomit; and at this time a sense of heat and tightness in the throat are first experienced, together with insatiable thirst. Hoarseness and difficulty of speech are consequent upon the violent vomiting, and in fact arise from it. The material vomited, next after the contents of the stomach, is a greenish-yellow matter, sometimes streaked with blood, although this last appearance is by no means a characteristic, and is to be ascribed to long-continued vomiting, as in sickness from natural causes. As the symptoms progress, the burning in the stomach increases, and has occasionally been likened to the stinging of nettles, and sometimes described by the sufferer to be like liquid fire, diffusing itself from the stomach over the whole abdomen, which is more generally, but not always, tense, and extremely tender under pressure. Diarrhœa, tenesmus, irritation and excoriation at the extremities of the mucous passages, namely, at the corners of the mouth, at the anus, in the urethra, and in the labia of the female, next ensue: the anxiety increases; the breathing is short and hurried, the patient being afraid to breathe from the abdomen, on account of its extreme tenderness; tremors and twitchings gradually introduce convulsions; the pulse, from the first attack of vomiting, becomes small, rapid, and feeble; and this feebleness of circulation is necessarily attended with coldness, clammy sweats, and lividity of the surface. These signs strongly mark the condition of collapse, and gradually introduce faintings or stupor, the patient either sinking calmly, or being hurried off by convulsions. The swollen, protruded, and blood-shot condition of the eyes, is not inflammatory, but merely the mechanical effect of excessive retching, as in the habitual vomiting of drunkards.

Antidotes.—Magnesia, charcoal, liver of sulphur, and, more recently, the hydrated peroxide of iron, have been proposed; but their effects are at best but doubtful. I recently attended a case with Mr. Betts, of Hammersmith, in which two drachms of the white oxide of arsenic had been swallowed. After the use of the stomach-pump, charcoal had been freely exhibited; and the vomiting, by means of dilution, was kept up for twelve hours. Six hours after ingestion (the patient then having been vomiting nearly the whole of that time), the greenish yellow fluid still yielded the appearances of arsenic to the usual tests. Large dilution was kept up for other six hours, until the material vomited no longer yielded traces of the poison. This patient perfectly recovered within thirty-six hours. Christison, however, objects to large dilution. Sydenham has a case where the patient recovered by mere dilution (to the extent of gallons), after taking an ounce of white arsenic.

Tests.—In supplying the outlines of the necessary inquiries into the mode of testing this and certain other more virulent poisons, it is convenient to premise that it is not within the plan of this work to comprehend the many substances which exert a fatal operation on the human frame. The most common will therefore be selected; and it will be found more useful to select a few of the most distinguishing characteristics, in order that the practitioner or retail chemist may be supplied with the means of detection: for although, in doubtful cases, recourse is very properly had to the more subtle analysis of the experienced chemist, it is chiefly in the power of the ordinary attendants to supply the ground-work for future investigation. The four tests chiefly approved for the detection of arsenic are ammoniacal nitrate of silver, ammoniacal sulphate of copper, hydrosulphuric acid gas, and reduction of the suspected compound to the state of metallic arsenic. Presuming that the operator has saved the material discharged by vomiting, or some remains of the suspected article of food or drink; or, if it be medicine, of the material from the packet or phial; and that, in a case of autopsy, he has carefully tied both ends of the stomach, or other part of the alimentary canal which it may be proper to remove, with a view to obtain the contents; after a due solution, elutriation, or infiltration, as the case may be, he proceeds to the following tests:—

No. 1. *Ammoniacal Nitrate of Silver.*—A solution of this compound must first be prepared by dropping liquor of ammonia into a strong solution of nitrate of silver, till the oxide of silver, which is first thrown down, *is nearly, but not entirely, dissolved.* Dropped into a fluid containing arsenic, it throws down an arsenite of oxide of silver of a bright queen's yellow, and nitrate of ammonia is left in solution.

No. 2. *Ammoniacal Sulphate of Copper.*—A solution of this compound is, in like manner, to be prepared by adding liquor of ammonia to a solution of sulphate of copper, until the oxide of copper first thrown down is nearly all redissolved. From certain fluids containing arsenic, this solution throws down the well-known pigment called *Scheele's green,* or arsenite of oxide of copper. The operator should, however, bear in mind, that Christison has proved that this ammoniacal sulphate produces a greenish precipitate in some animal and vegetable infusions not containing arsenic; whereas in other mixed fluids, such as tea and porter, to which arsenic has been previously added in a small proportion, it occasions none at all.

No. 3. *Hydrosulphuric Acid Gas, or Sulphuretted Hydrogen.*—The fluid to be examined must be first slightly acidulated with acetic or hydrochloric acid, in order to place it under favourable circumstances for this test; or if any unknown acid be present, it should be neutralized by potassa. Through the fluid thus prepared, Dr. Christison directs a current of hydrosulphuric acid gas to be conducted for ten or fifteen minutes. The first portions of the gas turn an arsenical solution of a bright lemon-yellow colour, and the subsequent portions throw down a sulphur-yellow precipitate.

No. 4. *Reduction to the Metallic State.*—The suspected powder, or either of the above precipitates, is to be put into a small test-tube with a little black flux,* or if the material be in a very minute proportion, it will be better to use freshly ignited charcoal; if charcoal, it will be proper first to let the powder fall entirely to the bottom of a small tube, $\frac{1}{8}$ of an inch in diameter, and to

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* Black flux is best prepared by deflagrating one part of nitre with two parts and a half of cream of tartar; or from two parts of ignited carbonate of soda, and one of charcoal.

cover it with a pinch of charcoal, and care should be taken that no particles adhere to the side of the tube, which should be quite clean. On applying the heat of a spirit-lamp the arsenic is sublimed, and forms a crust on the upper part of the side of the tube. The surface next the tube closely resembles polished steel; the inner surface is either brilliantly crystalline to the naked eye, like the fracture of cast iron, or has a dull grayish white colour.—*Christison.* As a further test, the crust may be chased up and down the tube until it is all oxidated, and octahedral crystals are formed, on which triangular facettes may be distinguished.—*Turner.* A still more delicate mode of effecting reduction, even from an arsenical solution, has lately been invented by Mr. Marsh ("Edin. New Phil. Journal," 1836). It depends on the fact, that whenever hydrogen in the nascent state is brought into contact with any compound of arsenic and oxygen, such compound is decomposed, and a gaseous compound of arsenic and hydrogen is generated. This gas is inflamed as it escapes through a fine tube, and if a piece of window-glass or porcelain be held in the flame, it is instantly covered with a thin coating of metallic arsenic; or if the flame be made to burn in the centre of a glass tube, open at both extremities, the inner surface of the latter is covered in half a minute with arsenious acid. The hydrogen is generated by adding to the suspected fluid dilute sulphuric acid, and suspending a fragment of zinc in it. The cylindrical glass vessel and capped bell-jar, furnished with a stop-cock and small gas-burner, may be procured at Palmer's, in Newgate Street.

Post-mortem Appearances.—If no inflammation ensues, and the arsenic destroys by a powerful impression on some vital organ—as, for example, upon the heart—the autopsy may disclose no marks of the ravages of this poison. More generally, however, the following are the appearances:—Traces of inflammatory redness of the fauces, œsophagus, and stomach. Softening of the villous coat, patches of extravasation and ulceration of the same organ. Sometimes red patches are seen, with streaks or lines of red running from them; effusion of lymph. Also, similar appearances in the duodenum, and the remaining portion of the alimentary canal.

Mercury, Bichloride of; Corrosive Sublimate.—The properties have been described at page 89.

Symptoms.—Vomiting, accruing immediately, or within a few minutes after the poison has been taken; increased by any thing taken into the stomach; violent pain in the epigastrium, diffused over the entire belly; violent and bloody purging, and nearly all the symptoms usually induced by arsenic. Taste, strongly metallic and corrosive; burning and tightness in the throat; countenance flushed and swollen; frequent and painful micturition; ptyalism.

Antidote.—When a solution of corrosive sublimate is mixed with the white of egg, a flocculent precipitate subsides, which is inert, and appears to be a compound of calomel and albumen.—*Orfila.* Hence the proper antidote for corrosive sublimate is a solution of the white of eggs.

Tests.—The suspected liquid should be strained, concentrated, and digested with an excess of pure potassa. The red oxide thus precipitated is afterwards to be sublimed in a small glass tube, by the aid of a spirit-lamp, and the mercury may be thus obtained in its characteristic condition of metallic globules. Christison's mode is preferable when the poison is mixed with organic matter. He recommends that the liquid, without previous filtration, be agitated with a fourth of its volume of æther, which separates the poison from the aqueous part, and rises to the surface. The ethereal solution is afterwards to be evaporated on a watch-glass, the dry residue to be dissolved in hot water, and the mercury to be precipitated in the metallic state. Sylvester's test answers very well for any solution not considerably diluted. Place a drop of the suspected liquid on a polished surface of gold, and touch the moistened surface with a piece of iron wire or the point of a penknife. The part touched instantly becomes white, owing to the formation of an amalgam of gold. The merit of having simplified this test is due to Dr. Paris.

Post-mortem Appearances.—Traces of inflammatory redness in the fauces and gullet extending throughout the canal; shrivelling of the tongue and enlargement of its papillæ; corrosion or ulceration of the villous coat of the same. The redness deeper, and more general, than in poisoning by arsenic.

Copper, Salts of; as Verdigris, Blue Vitriol, various Copper Pigments, &c.—Symptoms.—The symptoms are rapidly developed; violent headach, followed by vomiting; cutting pains of the bowels; diarrhœa, cramps in the legs and thighs; taste, strongly of copper, producing shuddering or rigors as the poison from time to time passes over the tongue, in the act of vomiting; occasionally jaundice, and amaurosis. When the symptoms prove fatal, convulsion, palsy, and insensibility, are the forerunners of dissolution.

Antidotes.—A yellowish-white compound is thrown down from a solution of the salts of copper, by the addition of white of egg, which M. Orfila has proved to be inert. The antidote, therefore, is albumen in water. The white of six eggs completely neutralizes the activity of about 30 grains of verdigris. The same author rejects the notion of the antidotal powers of sugar, which, however, have recently been again vindicated by M. Postel; and he partly founds his notion on the observation that sugar decomposes the cupreous salts at the natural temperature of the human body, and throws down oxide of copper. This remark is not original: Dr. Ure hazarded a conjecture nearly to the same effect in his Chemical Dictionary, sixteen years ago; with this difference, that he thought the resulting precipitate would be a carbonate.

Tests.—The best test for copper supposed to exist in mixed fluids is hydrosulphurous acid, more commonly called sulphuretted hydrogen. The sulphuret of copper thus precipitated is to be carefully collected, and to be heated to redness to char all organic matter. It should then be placed on a piece of porcelain, or on a watch-glass, and be digested in a few drops of nitric acid. Sulphate of protoxide of copper is formed, which, when evaporated to dryness, strikes the usual blue tint on the addition of ammonia.

Post-mortem Appearances.—The characteristic marks of inflammation in the gullet, stomach, duodenum, and jejunum and one or more of these parts; of an unusual green colour. Gangrenous patches near the pylorus and cardia, and sometimes ulceration. The skin sometimes of an ochre yellow; the lungs gorged with thick blood.

Lead, Oxides and Salts of; as Litharge, Red Lead, Ceruse or White Lead, Sugar of Lead, &c.—Symptoms.—The soluble salts of lead act locally as an irritant, although less powerfully than the other metallic poisons. Goulard's extract undiluted (for example) has produced violent ophthalmia and phymosis in two cases within my own experience, where it had been used by mistake for Goulard's lotion; and it therefore surprises me that its locally irritant effects have been disputed. The symptoms are mixed of the inflammatory, spasmodic, and nervous. I am enabled to sketch them from several cases attended by my own pupils. Sugar of lead in any dose, from about a drachm to an ounce, first irritates the mucous membrane of the gullet and stomach, as manifested by a pricking, hot, shooting pain in the throat and epigastrium, with a copious muco-purulent secretion. These symptoms are soon followed by colic pains, drawing in of the belly, diminished temperature, great prostration, slow pulse, and a sense of numbness in the limbs. The poison, however, rarely proves fatal in its immediate effects. The symptoms gradually abate, and a new train appears resembling those produced by lead gradually and insidiously taken into the body. Symptoms of colic recurring in paroxysm, anorexy, sickness, cramps of the stomach and limbs, obstinate costiveness. Sallowness of complexion and partial paralysis, not unfrequently followed by epilepsy, or by fatal convulsions. Limited as is the scheme of this short notice of poisons, I cannot refrain from entering my protest against the received opinion lately formed by the most eminent toxicologists of the comparative innocence of acetate of lead, and of its perfect harmlessness when given with acetic acid. That the acid diminishes the tendency to mischief, is very probable ; but this I take to be the law with regard to the effects of the oxide on salts of lead. On the majority of persons, lead introduced in small quantities produces no effects ; and even when introduced in large quantities, they escape after severe symptoms. On a few (probably not more than one in fifty), by idiosyncrasy, lead is as fatal in its effects, although those effects are slower, as arsenic itself. I have met with a case of violent spasm in the muscles of the throat, almost inducing suffocation, with protrusion of the eye-balls and a bloated livid face, as from a ligature round the neck, recurring in paroxysms, and entirely to be ascribed to breathing on the well-known fashionable glazed lead card, in the process of printing.

Antidote.—Emetic of sulphate of zinc. The alkaline and earthy sulphates in solution, as Epsom salts, Glauber's salts. The secondary symptoms being those of colica pictonum, require the usual treatment for that disease.

Tests.—Precipitate by hydrosulphuric acid ; collect and wash the precipitate ; digest it in nitric acid, diluted with twice its weight of water, until its dark colour disappears. Dry on a watch-glass to expel the nitric acid, and redissolve the residue in a little cold water. On the addition of a small particle of iodide of potassium, yellow iodide of lead will instantly appear.

Post-mortem Appearances.—The upper part of the alimentary canal, *i. e.* the gullet, stomach, duodenum, and part of the jejunum inflamed. Villous coat softened. The stomach is extremely retentive of lead : it has been detected in a case where the patient had survived three days. The appearances produced by the secondary symptoms are those seen after colica pictonum.

Antimony, Oxide and Soluble Salts of; as Emetic Tartar, &c.—Symptoms. The irritant effects of antimonials, when employed in poisonous doses, have been partly set forth in my " Pharmacopœia," at page 131. Nausea ; prostration, soon followed by vomiting and purging ; burning at the pit of the stomach ; sense of tightness in the throat ; deglutition difficult, and sometimes impossible ; violent cramps ; universal relaxation, and utter helplessness of the limbs.

Antidote.—Warm water, if vomiting has not yet commenced ; afterwards, the powder of yellow bark (*cinchona cordifolia*) may be given, diffused in water, that no time may be lost while a decoction of the same is prepared. If the pump is employed, care should be taken lest, the suction being too forcible, it may injure the stomach.

Tests.—If the suspected fluid be of a mixed nature, acidulate it with a little hydrochloric or tartaric acid, which will coagulate part of the organic matters, and completely dissolve any oxide of antimony. Then precipitate a sesquisulphuret of antimony, by transmitting through the solution a stream of sulphuretted hydrogen gas. Collect the orange-red sesquisulphuret, dry it, and having placed it in a glass tube, transmit through it a current of hydrogen gas, and when the atmospheric air is entirely displaced, heat it by the flame of a spirit-lamp. The sulphur passes off as sulphurous acid gas ; and metallic antimony, recognisable by its lustre, remains.—*Turner.*

Post-mortem Appearances.—Stomach and duodenum inflamed, thickened, and covered with a tough adherent mucus ; intestines empty.

Acids, Mineral, Sulphuric, Hydrochloric, Nitric.—Symptoms.—These poisons act directly upon the part to which they are applied, and by nervous sympathy the irritating impression is conveyed over the whole system. The signs are those of violent gastritis; but the prostration is more sudden, and the pains severer. High fever; burning and excruciating pain in the epigastrium, especially increased by drinking fluids, which are immediately rejected; great anxiety; eructations. The corners of the mouth and its inner surface are commonly excoriated, shrivelled, or more deeply ulcerated. The lips are at first white; then, after sulphuric acid, brown; after nitric, yellow. Deglutition difficult, sometimes impossible. If the patient vomit on a handful of chalk or whitening thrown into the basin, carbonic acid is copiously evolved. Long tubular portions or shreds of the gullet are sometimes thrown up with the material. The anxiety increases, and with it the embarrassment of breathing. The bowels are usually costive, and the urine scanty; but sometimes the irritation is propagated to the rectum, and induces severe tenesmus.

Antidotes.—Magnesia or its carbonate, chalk, whitening, powdered marble, or the scrapings from the plaster of the ceiling mixed into a paste with a little water, exhibited with the least possible delay. Milk, or any bland drink, may be freely exhibited to dilute the acid, while the antidote is in preparation.

Tests.—Their action on litmus paper, and their well-known properties of corroding animal matter, woollen and linen, &c., are their distinguishing characteristics. 1. Concentrated oil of vitriol is recognised by the properties enumerated at page 12. When diluted, it may be detected by adding first a little nitric acid, and then a few drops of a solution of nitrate of baryta. Sulphate of baryta is precipitated. 2. Undiluted hydrochloric (muriatic) acid is readily known by the opaque white vapours given off from it; an appearance arising from the great attraction of hydrochloric gas for the water of the atmosphere. In diluted fluids, it is best tested by means of nitrate of silver, with which it throws down a chloride of silver. 3. Undiluted nitric acid is most readily tested by the action of copper filings; effervescence ensues, and the nitric oxide which escapes forms (nitrous acid) orange-coloured vapours in the atmosphere. This action has been repeatedly explained in the course of the work. Nitric acid, largely diluted, is detected with difficulty. Having ascertained that the fluid is acid, as a foundation for your experiment, neutralize with potassa, evaporate to dryness; and if nitrous fumes be evolved by the addition of sulphuric acid, the presence of nitric acid is clearly indicated. Dr. O. Shaughnessy (*vide* "Lancet," 1829, 30, xi. 840), neutralizes and evaporates to dryness, puts the residue in a small tube, and heats it for a second or two with a drop of sulphuric acid. He then drops in a crystal of morphia, gently moving it at the edge of the mass, and if any nitric acid is present, the morphia quickly acquires an orange colour.

Post-mortem Appearances.—Marks of the corrosive effects of the acid on the skin, lips, fingers; brownish or yellowish-brown patches, likened to the appearance of old parchment; but if from sulphuric acid, more like the dry eschar of a burn. Mouth and fauces disorganized, whitish or yellowish, and generally hardened. The same marks of destruction throughout the gullet and stomach, with extensive corrosion, and occasionally with perforations in that organ. The external surface of the abdominal viscera, unusually vascular, presenting the fibrinous effusion, with adhesions like those arising from peritoneal inflammation: the same appearance sometimes in the serous lining of the chest and surface of the diaphragm. The pylorus contracted; and, in lingering cases, strictures and contractions in the intestines. When the pylorus has allowed the acid to pass, the duodenum exhibits the same marks.

Acid Hydrocyanic, or Prussic; Cherry-Laurel Water; Essence of Almonds, &c.—*Symptoms.*—The effects of a poisonous dose are immediate. Sometimes it is fatal in a few seconds. If the patient survive forty minutes, he usually recovers. Immediately after the taking of the poison, if standing, he staggers a few steps and falls, to all appearance, dead. The pulse is lost, and the breathing imperceptible; but before death, three or four forcible expirations, at intervals of half a minute or more, seem to draw the ribs almost to the spine. The extremities become cold, the eyes projecting, glistening, and insensible; and, by a last convulsive expiration, the tragedy is finished within a few minutes. It need not be swallowed in order to destroy life. I have met with a case of a lady who saturated a piece of the wadding of her muff with this acid, and tried to swallow it; it stuck in her throat, but killed her in a few minutes.

Antidotes.—1. Cold affusion. 2. Inhalation of the stronger liquor ammoniæ, diluted with 12 parts of water. 3. Inhalation of water, impregnated with a fourth part of its volume of chlorine. The first should be used instantly; and the second or third, or both, as soon as they can be procured. The employment of the stomach-pump would be mere loss of time, unless (which is improbable) the patient be not as yet insensible. One person should dash cold water over the patient; a second should hold to the mouth a large sponge, soaked in the liquor ammoniæ diluted as above; a third should clyster with the same diluted liquor; while a fourth procures the solution of chlorine, always to be kept ready by every practitioner. But, with the most scientific and prompt treatment, the case is all but hopeless.

Tests.—The odour of the acid; to be determined, however, by more than one person. From the suspected fluid, rendered alkaline by the addition of potassa, a greenish precipitate is thrown down, which becomes nearly white by the addition of a little hydrochloric acid. From the suspected fluid, rendered alkaline as before, sulphate of iron throws down a grayish-green precipitate, which becomes of a deep Prussian blue colour by the addition of a little sulphuric acid. Nitrate of silver precipitates a white cyanide of silver. *Vide* "Notes" in the Pharmacopœia. In testing mixed fluids, the colouring matter must first be destroyed by animal charcoal, or a slip of bibulous (filter) paper may be moistened with pure potassa, then dipped into the suspected fluid, and afterwards touched with a strong solution of the tests; or, lastly, the mixed fluid may be distilled.

Post-mortem Appearances.—The cavities, and even the blood, exhaling the odour of bitter almonds. The blood usually fluid and black; the brain gorged; the eye retaining a peculiar glistening and staring expression, long after death. The inner surface of the stomach and intestines reddish; the spleen and liver gorged. In the celebrated trial of Capt. Donnellan, charged with the murder of Sir Theodosius Boughton, the judge strongly insisted upon that part of the evidence of the medical men which embodied a unanimous and positive opinion that rapid putrefaction was the necessary consequence of death by prussic acid. In our time, it is contended that its presence *retards* putrefaction! *Vide* Coullon, "Recherches sur l'Acide Hydrocyanique." A medical practitioner ought to enter a witness-box with as much singleness of heart and pure humility as though he were about to take the sacrament.

Acid, Oxalic.—*Symptoms.*—Half an ounce of this acid is sufficient to destroy life. If a strong solution has been taken, the primary and immediate symptoms are burning pain in the stomach and gullet, followed in a few minutes by violent vomiting, and usually continuing till near the death of the patient. The circulation becomes much depressed; the countenance is pallid; the pulse feeble, or altogether imperceptible; the skin, cold and clammy. Convulsions sometimes occur a short period before death. The poison more usually destroys in a few hours.

Antidotes.—The remedies must be immediate, or they become ineffectual. If vomiting has not already occurred, an emetic may be exhibited. But the chief antidote is magnesia, or chalk, or the powdered plaster of the ceiling rubbed up with, or suspended in water, either of which form with the acid an insoluble compound; thus at once depriving it of its corrosive power on the coats of the stomach, and preventing its absorption into the blood. The stomach-pump may be employed in this and the preceding cases; but it is no adequate substitute for the proper antidotes.

Tests.—The crystals are six-sided prisms, flattened, transparent, colourless, inodorous, extremely sour, permanent in the air, strongly affecting litmus paper, and not easily distinguished from Epsom salts, except by the taste. From its concentrated solution, radiated crystallization is produced by the addition of ammonia; a white precipitate, by the hydrochlorate of lime, which is re-dissolved by adding a drop or two of nitric acid; a faint bluish-white precipitate is caused by sulphate of copper, not re-dissolved by the addition of hydrochloric acid; a white precipitate (oxalate of silver), by the addition of nitrate of silver. N.B.—No person ought to trust to a label, but should first taste his Epsom salt before he swallows it.

Post-mortem Appearances.—Marks of inflammation, corrosion, and occasionally perforations in the stomach. The mucous coat of the throat and gullet appears as if it had been scalded, and it is easily scratched off. The inner lining of the intestines has the same marks of inflammation as the stomach, but in a less degree. The inner surface of the wind-pipe is also inflamed. When death occurs, in an hour or two after death these appearances are not to be expected. The charred and black state of the blood has been attributed to the chemical changes effected by the acid after death.

Opium, and all its Preparations.—Symptoms.—Occasionally the effects are immediate, but more commonly they ensue after about half an hour; giddiness, stupor, irresistible drowsiness, soon passing to a state of insensibility; respiration slow and laboured; and in persons of a full habit, accompanied with stertor; pupils of the eyes contracted; the face, which is at first flushed, gradually, under the advanced action of the poison, becomes pale and ghastly. Simultaneously with this appearance, and not before, the pulse begins to fail, the skin is generally lax and moist, and the sweating has been observed to be most copious in fatal cases, the sheets being completely soaked by it. Vomiting after taking the poison is comparatively less frequent, and of course favours the recovery of the patient. Several cases of this kind have been recently recorded. Sometimes, where convulsions have preceded death, the features are found distorted, and the fingers contracted, but this is by no means common. The shortest period within which the poison has been known to be fatal, is three hours; the ordinary duration is from seven to twelve hours, but it is more rarely fatal after a much longer period. The minimum fatal dose for an adult is four grains; but that quantity would not poison one person in ten. Very great difference exists in constitution and susceptibility, both in infants and adults. An infant under a month, took two drops and a half of laudanum with impunity; another sank under a teaspoonful of syrup of poppies. Both cases came under my own immediate notice. Most persons recover if they survive twelve hours. I have seen at least twenty cases, several of which I will notice below.

Antidote.—The stomach-pump is in this case of paramount importance, but must not be allowed to supersede the use of emetics. In the next place, an emetic of zinc (℈ij.) should be exhibited, dissolved in two ounces of distilled water. Twenty years ago I attended a young lady (æt. 19) in Norfolk Street, and I exhibited four ten-grain doses before vomiting was induced. The dashing of cold water, or irritation by cowhage, promotes the action of the emetic. Dr. Christison says, the best method of keeping the patient roused is to drag him up and down between two men. I attended a case in Jermyn Street, in which Mr. Read, the celebrated machinist, removed the poison under my direction. After the action of an emetic I freely scattered the cowhage (which I had first proposed in 1820) over the naked neck and shoulders; and that gentleman, as well as the apothecary (Mr. Salter), had an opportunity of witnessing the fury excited by these means. Dragging a patient up and down is succeeded by languor; for the patient under the action of cowhage there is no rest. Some of my pupils will recollect my treatment of an infant (of about six months) at Turnham Green. To this child about six drops of laudanum had been administered in the middle of the preceding night. It was brought to me in the mother's arms at 10 o'clock the following morning, totally insensible, features pale and ghastly, respiration with difficulty to be distinguished. Under five-grain doses of sulphate of zinc and the dashing of cold water the child vomited. Respiration became forcible by successive sluicings with cold water; but the infant again and again relapsed into insensibility. I collected a bunch of nettles from my own garden, and beat the epigastric region until it was covered with vesicles. The child was roused, and cried for some minutes, and then again relapsed. The operation was again and again repeated with the nettles, and strong green tea was exhibited. I was obliged to leave the case to my pupils; and at three o'clock (about fifteen hours after the exhibition of the laudanum), the infant was permanently aroused, and is now alive. In adults of a full plethoric habit, if the face is flushed and the pulse hard, full, and slow, and the breathing stertorous, venesection is decidedly beneficial. Mr. ———, then and now practising in Great Surrey Street, was attended by the late Dr. Blegborough, Mr. Pollard, and myself, in 1820, for a condition which we all supposed to be apoplexy. Mr. ——— had hastily taken three five-grain pills of extract of opium, which had been sent from his druggists by mistake for extract of bark. We bled him to 20 ounces, and two hours had elapsed before we were apprized of our error, our attention being directed to the gallipot by the servant, who had seen him take the extract. We then gave a powerful emetic, and injected a strong purgative glyster, and afterwards Mocha coffee and strong green tea. Towards evening he perfectly recovered.

Tests.—Having filtered the mixed fluid, and discharged the colouring matter, add a small quantity of iodic acid; it produces a reddish brown colour, and the odour of iodine is perceptible. A concentrated alcoholic solution of iodine produces the same precipitate, and a pellicle reflecting the prismatic colours instantly forms on the surface of the liquid. The other test consists in detecting the morphia (*vide* Morphia, page 38, in the Pharmacopœia), and striking a yellow by the addition of nitric acid.

Post-mortem Appearances.—The brain and its sinuses gorged with blood; serous effusions in the ventricles; the lungs distended, and gorged with blood; some redness in the villous coat of the stomach and upper bowels; lividity of the skin is always present in a greater or less degree; the blood is generally found in a fluid state; the body rapidly putrefies; traces of the opium are sometimes found in the stomach. I lately discovered the poison in the stomach, in an autopsy which I performed with Mr. Sewell, of Milner Terrace, Lambeth.

Hyoscyamus niger: Henbane.—Symptoms.—When I recorded my opinion of the medicinal character of this plant, I thought I stood alone in my condemnation of it. M. Fourquier, in the "Archives Générales de Médecine," i. 297, "infers from his experiments, that in remedial doses *it never causes sleep*, but always headach, delirium, nausea, vomiting, and feverishness." In poisonous doses, the condition of coma, or insensibility induced by it, cannot be called sleep; for it is attended with low muttering delirium, and the foul tongue of typhomania. The first symptoms are usually stupor; dilated pupils; depraved vision; loss of speech, followed by coma, and delirium, sometimes of the furious kind. As the stupor abates, the delirium becomes more extravagant and unmanageable; and not somnolency, but protracted watching, is the prevailing condition.

Conium maculatum: Hemlock.—Symptoms.—Giddiness, headach, soon followed by insensibility, failure of the pulse, coldness of the surface, convulsions; and if the dose is not sufficient to prove fatal, frantic delirium, or paralysis, intervenes, before the recovery.

Aconitum: Monkshood.—The species seem to be confounded by our botanists. Within my knowledge, certain operators have sent to Germany for the root of *A. paniculatum*. More than half the aconites of our private gardens, and even the plant labelled " Aconitum napellus," at Kew, are nearer to the cammarums, of which the *A. paniculatum* is merely a variety; and either of them may become more or less panicled, according to soil or situation. How such an error should have been committed, and persisted in for fourscore years, is a matter of wonder. The College tell us they operated on the *A. paniculatum*, in preparing "Aconitina." Their operator tells us he put every new process to the test of his own experience. Did *he, too*, send to Germany for the root of this variety? If so, why were both his employers and himself so reserved as not to tell the public where they also might procure it? The true napellus has but three ovaries, rarely more; the cammarums, from three to five, and sometimes more on the same stem; and their flowers are larger, of a deeper blue, and more panicled: whence the name of Stoerk's variety. *Vide* De Candolle. In fact, then, the larger aconite of our own gardens is the plant from which the aconitina has been prepared in London, and is the same which Haller described as the aconite extolled by Stoerk; and the panicled monkshood is only a variety of the same genus. The whole error has arisen from confounding it with the *A. napellus*. I was at the trouble of going through the aconites with the botanical gardener at Kew (a meagre collection, by the way), and that gentleman was satisfied that he had not a *napellus* in his garden, and that the one so designated is nearer to the cammarum. The doubtfully wild aconites of Devonshire and of Hereford also yield the aconitina, and have been used for that purpose. This is the " Aconitum napellus," as I infer from the description of our British botanists.

Symptoms.—As it passes over the tongue, whether in the solid or liquid state, it first gives a sweet impression, with a sense of tightness; then, shortly afterwards, it tastes bitter, and produces a feeling of constriction in the muscles of the jaws; the head feels giddy, especially in the act of rising; a burning pain extends through the gullet to the stomach; a gnawing is felt at the cardiac orifice of this organ; oppression at the chest; colic pains; flatulency; the head becomes heavy; the patient has convulsive movements of the temporal muscles, and those of the face and neck; the eyes, also, are convulsed and blood-shot, and pour out tears; vomiting intervenes, and if the symptoms are not relieved, the tremors and shaking, like that of paralysis agitans, become general, to which succeed fainting, stupor, and death.

Atropa Belladonna: Deadly Nightshade.—Symptoms.—Dryness of the throat, extravagant delirium, with dilated pupils; afterwards, stupor. The symptoms of irritation are marked by difficult deglutition; subsultus tendinum; and, occasionally, by lock-jaw.

Nicotiana Tabacum: Tobacco.—Symptoms.—Nausea; giddiness, stupor, prostration of muscular power, and relaxation of all the fibres of the body; fainting; weak pulse; pallor; coldness of surface, followed by vomiting. In fatal cases lethargy supervenes, sometimes with stertor, before death.

Other Narcotics and *Acro-narcotics.*—The symptoms, more or less, resemble those produced by one or other of the above narcotics. Selections have been made, as fair examples, of both classes.

Antidotes.—Same as for opium. The symptoms of gastric irritation require the same treatment as those ordinarily employed for inflammation. It must be remarked, that either the narcotic effects or those of irritation are always predominant, and can scarcely co-exist. Hence our views must be directed to the relief of one or other class of symptoms, according to circumstances.

Tests.—The present state of the chemical analysis does not as yet supply us with satisfactory evidence of the presence of narcotics; for their chemical properties are either not sufficiently characteristic, or are not sufficiently known for the purposes of legal research.

Post-mortem Appearances.—These will be modified by circumstances. If the patients have sunk under the narcosis, congestion in the brain, sinuses, and lungs, and livid patches on the body, are most frequent. If the irritation has been predominant, the alimentary canal will bear the usual traces of inflammation. For a further and more particular account, I refer my readers to Dr. Christison's work on Poisons.

Vegetable and other Acrids.—Those commonly attendant upon inflammation of the mucous coat of the stomach and bowels. The treatment will consist in promoting the rejection of the acrid matter by bland diluents, and subsequently relieving the symptoms of irritation or depression, as the case may be.

Alkalies.—*Symptoms.*—An acrid burning taste, with rapid destruction of the mouth; same effects on the fauces, gullet, and stomach; difficult deglutition; violent bloody vomiting; symptoms of acute gastritis, with great tenderness of the belly; in the sequel, cold sweats, universal prostration, hiccup, long-continued violent pains, excessive purging, and fatal exhaustion.

Antidotes.—Weak acids, as vinegar, lemon-juice, or oil. Some prefer the latter.

Tests.—*Vide* the Alkalies in the Pharmacopœia, and the same in the "Notes."

Post-mortem Appearances.—Same as in inflammation, but with greater destruction of parts, and more extensive effusion of lymph.

Poisonous Gases.—Their effects are chiefly exerted on the respiratory organs, and it will suffice to suggest that a free access to the air, dashing of cold water, and the relieving of congestion by small bleedings, or cuppings at the nape of the neck, have been found most successful; friction and artificial respiration are not to be neglected.

TRADE CHEMICALS

FOR WHICH NO PROCESS IS FOUND IN THE PHARMACOPŒIA.

Acetate of Soda is largely supplied by the manufacturers of pyroligneous acid, by saturating the impure acid with chalk, so as to form an acetate of lime, and decomposing the acetate by sulphate of soda, thereby producing a soluble acetate of soda and an insoluble sulphate of lime: the solution is readily crystallized. It consists of 1 equivalent of acetic acid, 1 equivalent of soda, and 6 equivalents of water.

Ærugo: Cupri Diacetas impura.—This article has been sufficiently noticed at page 57 of this work.

Amylum: Starch.—The best starch is made almost exclusively from wheat meal; but it may also be prepared from rye or other grain, from potatoes, and other farinaceous roots. The process consists in disengaging the fecula, and other parts of the grain, from the gluten, by fermentation and repeated washings. Many of the retail chemists in the crowded districts, and near the markets of London, prepare a sort of starch from potatoes, and supply it to the public as the finest Indian or Bermuda arrow roots. Sago, cassava, tapioca, are also so many kinds of starch. Sago is prepared from the *Sagus genuina* (Rumphii), and the *S. farinifera* (Lamarck); tapioca and cassava from the *Jatropha manihot.* The root of the *Maranta arundinacea* supplies the kind of starch called arrow root. It yields 26 per cent.

Baryta, Carbonate of.—Native carbonate of baryta has been found in Wales, and various parts of England; but it may be prepared artificially, by precipitating the soluble salts of baryta by means of the alkaline carbonates. It is highly poisonous; nearly insoluble; water at 60° only takes up $\frac{1}{4300}$ part, and boiling water only $\frac{1}{2300}$ part. Saturated with carbonic acid, water takes up $\frac{1}{830}$ part.

It consists of 1 equivalent of Baryta............ = 77
1 ——— Carbonic Acid...... = 22
99

Borax: Soda Biborate of, P. L.—According to Brande, this salt is a borate and a biborate. It is imported from India in an impure state, more commonly under the name of tincal; and after purification it gains the name of borax. Latterly it has also been manufactured by combining soda with native boracic acid, imported from the south of Italy. Its crystals are in irregular hexaëdral prisms, very slightly efflorescent. It was formerly called subborate of soda, from its alkaline reaction on vegetable colours. Its use as a blow-pipe flux is very common. I presume the term biborate is retained in the columns of the Materia Medica of P. L. by error, or oversight.

Remedial Use.— *Vide* Mel Boracis, page 126 of the Pharmacopœia.

Creasote, or *Kreasote*.—If wood-tar is subjected to distillation till the residue has the consistency of pitch, an oil and acid water pass over. If the former is separated from the sour water, two products are again obtained—an oil and sour water; but the oil is now much heavier than before. The acid water is again rejected. This heavy oil, freed from acetic acid by carbonate of potassa, and by repeated distillations with liquor potassæ, ultimately by the addition of diluted sulphuric acid, yields creasote when submitted to a further distillation.

Cupri Sulphas: Blue Vitriol.—The purest in the market is formed by dissolving peroxide of copper in diluted sulphuric acid, and is also obtained as a refuse in the process for refining gold and silver. A rougher and less pure sort is prepared by exposing roasted copper pyrites (*sulphuret of copper*) to the combined effects of air and moisture, just as common green vitriol is made by exposing roasted iron pyrites to the same agencies. The metal becomes oxidized; and the sulphur, gradually converted into sulphuric acid, unites with the oxide to form a sulphate.

Remedial Use.—Tonic, antispasmodic, emetic, and externally escharotic. It has been much used within the last few years for long-standing dysentery and diarrhœa. Dose, from gr. ss. to gr. ij. combined with opium.

Epsom Salts.—This salt is largely obtained from the bittern which remains after obtaining common salt from sea-water. This residue contains sulphate of magnesia and chloride of magnesium, and the latter is decomposed by the addition of sulphuric acid. Epsom salt is likewise largely obtained from magnesian limestone by the action of the same acid, and it is yielded in the process adopted by some manufacturers in the preparing of alum. That produced in alum works is usually found to contain traces of iron. I have known the credit of a retail chemist considerably compromised by having been supplied with a quantity of this last kind, which many of his best customers sent back, not without alarm. If this impure salt is drunk off immediately after solution, its impurity is not noticed; but when (as is the habit with some patients) the crystals are dissolved the over-night, the solution by the morning acquires the tint of rust of iron, and is usually sent back with dissatisfaction. This sulphate is occasionally adulterated with sulphate of soda. To detect the fraud, dissolve 100 grains of the crystals, and precipitate by adding carbonate of potassa. When dried at 212° the precipitate should weigh 40 grains: an inferior weight of precipitate indicates this sort of adulteration.

Glass of Antimony.—When the native sulphuret of antimony is exposed under a muffle to a dull red heat, it gradually loses sulphur and absorbs oxygen. It is thus converted into a mixture of protoxide of antimony and sulphuret, in the form of a grayish powder; but if the heat be increased, it fuses into a transparent substance like stained glass, of a yellow or brown colour, called glass of antimony, consisting usually of 85 parts of protoxide, and 15 parts of sulphuret of antimony.

Magnetic Oxide of Iron.—This medicine is likely to become a matter of general interest, from the high celebrity of the physician (Dr. Jephson) who has introduced it to notice. We therefore subjoin the formulæ:—

Take 21½ oz. of crystallized sulphate of iron in coarse powder: put it into an earthen vessel, holding about two quarts; add to it two pints of water, and four fluidounces of strong nitric acid: let it be kept at about 180 degrees of temperature, and frequently stirred till the iron is fully oxidized. This point may be ascertained by testing a drop of it with a solution of per-prussiate of potash, on a white plate. As long as any protoxide of iron remains, a blue precipitate will be occasioned. If the nitric acid is not sufficient to peroxidize the iron, add a little more, and continue the digestion. When the iron is fully peroxidized, let the solution cool. Dissolve 10¾ ounces of crystallized sulphate of iron in 3 pints of water; add this suddenly to the solution of peroxide. Put into an iron pan (holding about 6 quarts) 40 ounces of crystallized subcarbonate of soda. Add 3 pints of water, and apply heat till the soda is dissolved. Into this solution pour gradually the mixed solution of iron, stirring them well together. Set the pan over a fire, and boil the contents briskly for half an hour; take it off; let the precipitate subside, and pour off the clear liquid. Add fresh water, about three quarts, and boil again for an hour. Let the precipitate settle, and wash it three or four times (without boiling), with fresh water, to separate the neutral salts. Pour the precipitate on a piece of strong muslin, and let it drain till the bulk is equal to one pint by measure, but do not allow it to become dry. This precipitate should be mixed with 31 pints of water, or 31 times its bulk, and of this mixture the dose may be from 2 to 4 drachms, and of the powder from 10 to 30 grains, three times a day. One fluidounce of the diluted mixture will contain the oxide of iron from 27·3 grains of sulphate of iron; two-thirds of this being in a state of peroxide, and one-third protoxide. The precipitate is nearly black, and does not absorb oxygen when exposed to the air; when dry, it is nearly as much affected by the magnet as iron filings.

Nitre.—It is produced abundantly by the lixiviation of certain soils in the East Indies, from whence it is imported. It is brought chiefly in the rough state, and is purified by solution, infiltration, and re-crystallization, under which process a considerable diminution of weight is necessarily incurred. This loss is technically termed the refraction. In Germany and France, since the time of Fourcroy, it has been artificially produced in nitre-beds made of old plaster rubbish, wood-ash, animal manure, &c.

Remedial Uses.—I know of no refrigerant diuretic more certain in effect than nitre. Let any person, even in health, take ʒj of nitre per diem in divided doses, and chilliness is sure to ensue, so that in two or three days the medicine becomes insupportable.

Dose, gr. x. to ʒss.

Oxalic Acid.—It exists in the sorrels, and in all the varieties of rhubarb, but it is commonly prepared by the action of four parts of nitric acid diluted with two of water upon one part of sugar. Nitric oxide gas is copiously evolved; and about one-third of the acid having been distilled over, the contents of the retort are emptied into a shallow vessel to favour crystallization. Several cups of crystals are thus produced by further evaporation, and by repeated solution and crystallization the oxalic acid is obtained in a pure state.

Prussian Blue; Percyanide of Iron, P. L.; Ferrosesquicyanuret of Iron of Brande's "Manual."—Discovered by Diesbach in 1710. It is prepared in various ways; more commonly, however, by precipitating solutions of peroxide of iron by the ferrocyanuret of potassium, more generally called prussiate of potassa.

According to Berzelius, Prussian blue consists of—

4 equivalents of Sesquicyanuret of Iron............ = 268
3 ——— Cyanuret of Iron .... = 162
430

Prussiate of Potassa; Ferrocyanide of Potassium, P. L.; Ferrocyanuret of Potassium of Brande's "Manual."—It is procured most pure by heating powdered Prussian blue with diluted sulphuric acid, composed of one part of acid and five of water, and adding it to a solution of potassa as long as its colour is destroyed. For the use of calico-printers as a dye, it is largely manufactured by projecting pearl-ash in an iron pot upon offal animal matter, as hoofs, horns, &c., and stirring the mixture with a flat iron paddle. The crystals are of a lemon-yellow colour; sp. gr. 1·83; more soluble in hot than in cold water, and not readily soluble unless previously triturated. Water at 60° takes up about one-third, and at 212° its own weight of this salt. The toughness of the large crystals impedes solution. Its proximate composition is as yet doubtful. Mr. Porrett supposes it to consist of—

1 equivalent of Hydrocyanite of Iron.............. = 63
1 ——— Hydrocyanate of Potassa .... = 150
213

Sal-Ammoniac; Ammoniæ Hydrochloras.—This salt in former times was imported from Egypt, where it was obtained by the incineration of camels' dung. It is now procured by various chemical processes, according to the convenience of the manufacturers, from certain residues left after the manufacture of other chemicals. The ammoniacal liquor of gas-works, or the impure carbonate of ammonia, formed by the distillation of bones, hoofs, offal, and other refuse animal matter, are the most common sources. Such liquors, saturated with diluted sulphuric acid, yield sulphate of ammonia; and, by the addition of common salt, the products will be muriate (hydrochlorate) of ammonia, and sulphate of soda.

Remedial Use.—It has been used as a refrigerant and discutient externally. The inconsistency of these two operations has often forcibly struck me. It discusses by its stimulating operation; and if used in a concentrated form, it will produce a pustular eruption: but how or why it should refrigerate, except by the absorption of caloric during solution and gradual evaporation, I cannot imagine. If used for this last purpose, it should be allowed to dissolve gradually in a bladder. For its use internally, *vide* Pharmacopœia, page 145.

Sodæ Phosphas: Tasteless Purging Salt.—This is another salt of soda, to which a place is assigned in the columns of the Materia Medica, without further notice in the Pharmacopœia. It is the neutral or rhombic phosphate, called by the late Dr. Turner *Triphosphate of Soda and Basic Water.* It is prepared from the impure phosphoric acid, obtained by the action of sulphuric acid on bones, by saturating it with carbonate of soda. This salt is always alkaline to test-paper, and requires four times its weight of cold, and twice its weight of boiling water, for solution. The crystals effloresce by exposure.

Remedial Use.—Mild purgative, sometimes administered in broth. Dose, ℥ss. to ℥j.

Weights and Measures used in compounding Medicines in England and France.

ENGLISH TROY WEIGHT.

Pound ...... ℔ = 12 ounces.
Ounce ...... ℥ = 8 drachms.
Drachm ...... ʒ = 3 scruples.
Scruple ...... ℈ = 20 grains.
Grain........ gr. = 1 grain.

ENGLISH MEASURE.

Gallon, *congius* .... = 8 pints.
Pint, *octavius* .... O = 20 fluidounces.
Fluidounce ....f. ℥ = 8 fluidrachms.
Fluidrachm ....f. ʒ = 60 minims.
Minim .... ♏ = 1 minim.

FRENCH WEIGHT.

Kilogramme = 1000 grammes = 2 metrical pounds.
Livre .... ℔ = 500 ...... = 16 onces.
Once .... ℥ = 31·25 ...... = 8 gros.
Gros .... ʒ = 3·90 ...... = 3 scrupules.
Scrupule ℈ = 1·30 ...... = 24 grains.
Grain .. gr. = 0·05 ...... = 1 grain.

FRENCH MEASURE.

Litre, or decimetre cube .... = 2 ℔s
Chopine, or ½ litre .... = 1 ℔
Setier, or ¼ litre .... = 8 ℥
Verre, or ½ setier (glass) .... = 4 ℥
Cuillerée à bouche (tablespoonful) .... = 4 ʒ
Cuillerée à café (teaspoonful) .... = 1 ʒ
Goutte (drop) .... = 1 gr.

COMPARISON BETWEEN ENGLISH AND FRENCH WEIGHTS.

English.		*French.*					
		Grammes.		Onces.	Gros.	Scrup.	Gr.
℔j.	=	372·96	=	12	1	1	13·77
℥j.	=	31·08	=	1	0	0	9·14
ʒj.	=	3·88	=	0	1	0	1·13
℈j.	=	1·29	=	0	0	0	0·37
Gr.	=	0·06	=	0	0	0	1·21

COMPARISON BETWEEN ENGLISH AND FRENCH MEASURES.

English.		*French.* Litre.
Cong. j....................	=	3·7851
O. j......................	=	0·4799
f. ℥j......................	=	0·0295
f. ʒj......................	=	0·0039
♏ j......................	=	0·0006

The imperial gallon, now substituted for all other measures, is one-fifth more than the old wine gallon (30 imperial = 36 wine), and one-sixtieth less than the old ale gallon (30·5 imperial = 30 ale). It contains 10 pounds of water, of 7000 grains each (avoirdupois pounds) = 70,000 grains = 277·273 cubic inches of water at 62°.

A Table of the Weights of the principal European and American Pharmacopœiæ, converted into American Apothecaries' Grains and French Grammes.

United States and Foreign Pharmacopœiæ.	Apothecaries' Grains.	French Grammes.
London, Edinburgh, Dublin, and the United States Pharmacopœiæ.		
℔j. .. pound.......... 12 ounces........	5760	372·96
℥j. .. ounce.......... 8 drachms	480	31·08
ʒj. .. drachm .... 3 scruples	60	3·88
℈j. .. scruple .... 20 grains	20	1·29
Gr.j. .. grain .... 1 grain	1	·065
French Codex.		
℔j. .. pound.......... 16 ounces........	7722	500
℥j. .. ounce.......... 8 drachms	482·5	32
ʒj. .. drachm .... 3 scruples	63	4
℈j. .. scruple .... 20 grains	21	1·3
Gr.j. .. grain .... 1 grain	0·878	0·05
Italian Pharmacopœiæ.		
The Italian pound consists of twelve French ounces, and is subdivided as the French pound.		
Batavian Pharmacopœiæ.		
℔j. .. pound.......... 12 ounces........	5701	396·12
℥j. .. ounce.......... 8 drachms	475	30·76
ʒj. .. drachm .... 3 scruples	59	3·84
℈j. .. scruple .... 20 grains	19·66	1·28
Gr.j. .. grain .... 1 grain	0·983	0·064
Austrian Pharmacopœiæ.		
℔j. .. pound.......... 12 ounces........	6592	420·36
℥j. .. ounce.......... 8 drachms	549	35·03
ʒj. .. drachm .... 3 scruples	69	4·38
℈j. .. scruple .... 20 grains........	23	1·46
Gr.j. .. grain .... 1 grain	1·15	0·072
Danish and Swedish Pharmacopœiæ.		
℔j. .. pound.......... 12 ounces........	5501	356·22
℥j. .. ounce.......... 8 drachms	456	29·68
ʒj. .. drachm .... 3 scruples	57	3·71
℈j. .. scruple .... 20 grains	19	1·23
Gr.j. .. grain .... 1 grain	0·94	0·061
Pharmacopœiæ of Prussia, Russia, Finland, Poland, and of several German States.		
℔j. .. pound.......... 12 ounces........	5524	357·66
℥j. .. ounce.......... 8 drachms	460	29·80
ʒj. .. drachm .... 3 scruples	58	3·72
℈j. .. scruple .... 20 grains	19·50	1·24
Gr.j. .. grain .... 1 grain	0·97	0·062

MEASURES OF CAPACITY.				Apothecaries' Grains.	French Grammes.
London, Edinburgh, and Dublin Pharmacopœiæ.					
C.	Congius	Gallon	8 pints	70000	4540·8
O.	Octans	Pint	20 fluidounces	8750	567·6
f.℥	fluiduncia	fluidounce	8 fluidrachms	437·5	35·61
f.ʒ	fluidrachma	fluidrachm	60 minims........	54·68	4·45
♏.	minimum	minim	1 fluidgrain......	·911	·073
French Codex.					
One litre, or pinte	℔ij.		2 French pounds.	15444	1000
Half litre, or chopine	℔j.		1 do. pound .	7722	500
Quarter of a litre, or setier	℥ viij.		8 do. ounces ..	3861	250
One-eighth of a litre, or half setier	℥ iv.		4 do. do.....	1930	125
Cyath. or tumblerful	℥ v.		5 do. do.....	2412	156·25
Cochl. maj. or tablespoonful	ʒ v.		5 do. drachms..	315	19·5
Cochl. min. or coffeespoon	ʒ j.		1 do. do.....	63	3·9
Gut. drop	gr.j.		1 do. grain....	0·878	0·055
The Swedish Kanne, Cantharus, contains 88 Swedish ounces				40128	2622
The Berlin Measure contains 36 Nuremberg ounces ..				16560	1082·8

A TABLE,

SHEWING IN WHAT RATIO OPIUM AND CERTAIN PREPARATIONS FROM OPIUM, ANTIMONY, ARSENIC, MERCURY, AND OTHER ACTIVE PRINCIPLES, ARE CONTAINED IN CERTAIN COMPOUND MEDICINES.

Opium.

TINCTURE of Opium (Laudanum) holds in solution one grain of Opium *in* nineteen minims.

Wine of Opium holds in solution one grain of Opium *in* twenty-three minims.

Confection of Opium contains a grain of Opium *in* about thirty-six grains, supposing the syrup therein contained to weigh twenty ounces.

The Compound Powder of Chalk with Opium contains one grain of Opium *in* two scruples.

The Compound Powder of Ipecacuanha contains one grain of Opium *in* ten grains.

The Compound Powder of Kino contains one grain of Opium *in* a scruple.

Liniment of Opium contains one drachm of Tincture of Opium, or three grains of solid Opium, *in* four fluidrachms.

Compound Pills of Styrax contain one grain of Opium *in* five grains.

The Pills of Soap with Opium contain one grain of Opium *in* five grains.

Mercury.

Liniment of Mercury contains one drachm of Mercury *in* a little less than six drachms.

Liquor of Bichloride of Mercury contains one grain of Bichloride of Mercury *in* two fluidounces.

The Pills of Mercury contain one grain of Mercury *in* three grains.

The Compound Pills of Chloride of Mercury contain one grain of Chloride of Mercury *in* about four grains.

The Strong Mercurial Ointment contains one drachm of Mercury *in* two drachms.

The Mild Mercurial Ointment contains one drachm of Mercury *in* six drachms.

The Ointment of Nitrico-Oxide of Mercury,

The Ointment of Iodide of Mercury, and

The Ointment of Biniodide of Mercury, severally contain one grain of the mercurial which determines their name, *in* nine grains of the mass.

The Ointment of Nitrate of Mercury contains one grain *in* about twelve.

Emetic Tartar.

Liquor of Potassio-tartrate of Antimony contains one grain of Potassio-tartrate of Antimony *in* four fluidrachms.

Arsenic, Oxide of.

The Liquor Potassæ Arsenitis contains one grain of Oxide of Arsenic *in* two fluidrachms.

Iodine.

Compound Tincture of Iodine contains ½ a grain of Iodine, and one grain of Iodide of Potassium *in* twenty minims.

Compound Liquor of Iodide of Potassium contains ¼ of a grain of Iodine and ½ a grain of Iodide of Potassium *in* each fluidounce.

Compound Ointment of Iodine contains about two grains of Iodine, and four grains of Iodide of Potassium *in* one drachm of the mass.

Colchicum.

The Wine of Colchicum contains four grains of the corm *to* twenty minims of Sherry Wine.

The Compound Tincture of Colchicum contains two grains and a half of Colchicum seeds *to* twenty minims of the Aromatic Spirit of Ammonia.

Acetum Colchici contains three grains of the corm to one drachm of the menstruum.

Digitalis.

Tincture of Digitalis contains one grain *to* ten minims.

Infusion of Foxglove *now* contains about three grains *to* the ounce of fluid.

Squills.

Tincture of Squills contains two grains and a half of Squill-Root *to* twenty minims.

Vinegar of Squills contains two grains of Squill-Root *to* twenty minims.

LATIN INDEX.

ENGLISH INDEX.

THE END.

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