PHARMACOPOEIAS, London,
RCP

THE LONDON MANUAL OF MEDICAL CHEMISTRY,

COMPRISING

AN INTERLINEAR VERBAL TRANSLATION

OF THE

PHARMACOPŒIA,

WITH

EXTENSIVE CHEMICAL, BOTANICAL, THERAPEUTICAL, AND POSOLOGICAL NOTES,

NOT ONLY IN REFERENCE TO THE MEDICINES ENUMERATED IN THAT WORK, BUT ALSO TO THOSE WHICH HAVE RECENTLY BEEN INTRODUCED IN PRACTICE;

TOGETHER WITH

THE TREATMENT AND TESTS OF POISONS,

AND

AN INTRODUCTION,

CONTAINING

THE THEORY OF PHARMACEUTICAL CHEMISTRY, &c. &c.

FOR THE USE OF STUDENTS.

By WILLIAM MAUGHAM,

SURGEON, AND LECTURER ON CHEMISTRY AND MATERIA MEDICA.

"Forsan et hæc olim meminisse juvabit."

LONDON:

WHITTAKER, TREACHER, AND CO.,

AVE-MARIA LANE.

1831.

TO

DAVID UWINS, M.D.

This Volume,

AS AN HUMBLE TESTIMONY OF ESTEEM AND GRATITUDE,

IS MOST RESPECTFULLY INSCRIBED,

BY HIS FORMER PUPIL,

THE TRANSLATOR AND COMMENTATOR.

LONDON:
HENRY BAYLIS, JOHNSON'S-COURT, FLEET-STREET.

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ERRATA.

Page xxxiv, line 2, for 0.8, read .08.
51, line 14, for *acetic acid*, read *carbonic acid*.
345, line 11, for *ammiotic acid*, read *amniotic acid*.
442, line 13, for *binoxalate*, read *oxalate*.

The words *Edinburgh Pharmacopœia* occur in one or two places instead of *Dublin Pharmacopœia*.

TRANSLATOR'S PREFACE.

SOME years ago I published a translation of the London Pharmacopœia, which has passed through several editions. My pupils, however, have repeatedly complained of the inefficiency and inconvenience of that manual; the notes being too concise, and the arrangement of the translation extremely confused—the English following the Latin in the same line. After repeated solicitations to offer something more adapted to their use, I have at length determined to give a translation in the present form (commencing with the preface), accompanied with a new series of notes, and a condensed Botanical, Chemical, and Medical History of the articles of the *Materia*

Medica. In addition to this, an Introduction is prefixed, which, with the notes themselves, will be found to contain a complete epitome of that part of the science of Chemistry that comes more immediately under the observation of medical men. Such medicines as have been lately introduced in practice, and which are not comprised in the list of those approved of by the London College, are also brought under consideration.

It was impossible, from the arrangement adopted by the College, to offer the notes in any other form than that in which they are placed; but it is to be hoped that the trouble of an occasional reference to different parts of the work, will be repaid by the information that will eventually be obtained. Where references appear to be wanting, the *Index* may be consulted with advantage; and where the atomic constitution of bodies is omitted, it will be met with by turning to the *Table of Atomic Weights* in the *Appendix*.

Under the head *Officinal Preparations* are included, not merely those preparations into which any article enters in composition, but those also in the formation of which it is employed as a *Pharmaceutical* agent.

It has been my object throughout to express myself as concisely as possible, that the most information might be brought within the least possible compass; but at the same time I have endeavoured to avoid obscurity, and have studiously sought the latest intelligence in each department treated upon. Whenever a difference of opinion has been found to exist, resting upon theory only, that view of the subject has been preferred which is most agreeable to the present state of science; thus leaving the attention of the student undivided by a multiplicity of obsolete hypotheses.

In conclusion, I may observe, in the words of Dumas, that, " beaucoup de personnes auraient pu faire un semblable ouvrage, et l'auraient fait mieux que moi; mais je suis porté à croire qu'elles auraient reculé devant le travail matériel qu'une semblable tâche entraîne."

London, 1831.

PREFATIO EDITIONIS, 1809.

PREFACE OF THE EDITION OF 1809.

ANNIS viginti duobus* vix elapsis,
Twenty-two years scarcely having elapsed,

iterùm statuimus reddere nostram Pharmaco-
we have again determined to give our Pharmaco-

pœiam incudi. Indiès culta, et amplificata
pœia to the anvil. The daily cultivated, and extended

scientia Naturæ imposuit nobis
knowledge of Nature has imposed upon us

hunc laborem. Enim, intra paucos hos annos, illa
this undertaking. For, within these few years, it

ità purgata est erroribus, et illustrata
has been so freed from errors, and elucidated

experimentis, ità stabilita undequaque novis,
by experiments, so established on all sides upon new,

firmioribus, altioribus principiis, ut si in hâc unâ
firmer, (and) more exalted principles, that if in this one

parte, quæ spectat ad Medicinam jaceret
part, which relates to Medicine it remained

neglecta et rudis, id meritò verteretur
neglected and unimproved, it would deservedly be considered

---

* In the Latin text, I have in general placed the adjective after the substantive, and the adverb with the verb in the order of the original; but I should trust this cannot possibly lead to any misunderstanding.

dedecori nobis; præcipuè cum duæ finitimæ Artes
a disgrace to us; especially since two collateral Arts

huic nostræ — Chemica et Botanica — hæc
to this of ours — the Chemical and Botanical — this

exploraverit cum labore maximo omnes Herbas
has explored with the greatest diligence all the Plants

omnium regionum; illa commutaverit suam integram
of every country; that has changed its whole

disciplinam in meliorem, et didicerit loqui
system for a better, and has learned to speak

linguam penitùs novam. Igitur videtur
a language entirely new. It therefore appears

non ulteriùs spatium esse moræ, quin
that there is no longer room for delay, but that

perpendamus vires et naturam
we should examine thoroughly the virtues and nature

medicamentorum omnium cum summâ diligentiâ
of every medicine with the greatest attention,

ut si fuerint, quæ judicemus vel
that if there should be any, which we may deem either

obsoleta vel supervacua, moveamus
useless or unnecessary, we may remove (them)

loco.
from the list.

Antecessores nostri plurimùm sanè contulerunt
Our ancestors have certainly very much contributed

ad conficienda singula certiùs promptiùsque;
towards preparing each (article) more certainly & more readily;

enim jàm tùm lux nova philosophiæ exoriebatur,
for even then the new light of philosophy was arising,

quæ discutiebat nubila pristinæ disciplinæ,
which dispelled the clouds of the ancient system,

fugabat formidines vanas simul cum tenebris,
put to flight the groundless fears along with the difficulties,

denique, eatenùs recludebat secreta Naturæ,
and, in short, so far revealed the mysteries of Nature,

ut quid esset incongruum, quid consentaneum,
that what was incongruous, what proper,

quænam pugnantia inter se,
those things which disagreed amongst themselves,

quænam consocianda aptissimè
and those things which were to be united together most readily

in compositione tandem ostenderet palàm oculis
in composition it at length shewed plainly to the eyes

medicorum. Sed ea est conditio artis, ut
of physicians. But such is the condition of art, that

possit quidèm emendari, non possit
it is able certainly to be improved, (but) it is not able

reddi absoluta.
to be rendered perfect.

Exindè, igitur, in annos singulos aliquid
Since that period, therefore, in every year something

accessit medicinæ; neque hæc ætas nostra
has been added to medicine; nor has this age of ours

declinavit à incœptis priorum,
declined from the undertakings of the former,

quin et exposuit accuratiùs signa
but has both expounded more accurately the signs

morborum quorundam, et reperit remedia magis
of certain diseases, and devised remedies more

idonea quibusdam; tum rejecit alia inutilia
appropriate for some; it has also rejected diverse useless

et inepta medicamentorum, usu
and inert (articles) of medicine, (and) by experience

et autoritate, comprobavit alia valentiora;
and authority, has approved of others more efficacious;

etiam aut scrutata est universa diligentiùs
it has likewise either examined the whole more diligently

aut edocuit quomodo peritiùs compo-
or has shewn in what manner they may be more

nantur. Cum nos igitur primùm
skilfully compounded. When we therefore first

intendimus animum ad recognoscendum hoc opus,
turned (our) attention to revise this work,

invenimus multa quæ malè congruebant
we found many things which ill accorded

cum perfectiore disciplinâ nostræ artis, plura
with the more perfect practice of our profession, more

quibus erudita illa norma appellandarum rerum,
with which that erudite method of naming things,

(quam physici intereà
(which natural philosophers in the mean while

excogitaverant) abhorrebat, nonnulla etiam quæ
had thought of) disagreed, (and) some also which

ordo, et concinnitas ipsius operis postulabat
the order, and neatness of the work itself required

addi. Non idèo tamen fefellit nos multum
to be added. But it did not however escape us that much

molestiæ, multum etiam periculi provenire
of inconvenience, much also of danger arises

à crebrâ mutatione Pharmacopœiarum; sed
from a frequent alteration of Pharmacopœias; but

persuasum erat nobis, ea tandem
we were persuaded, that those (things) in the end

fore et maximè stabilia et utilia, quæ
would be both most permanent and useful, which

arctissimè convenirent cum rectâ ratione.
most strictly accorded with sound reason.

Quibus perpensis, statuimus,
Which things being well considered, we resolved,

quantùm potuit fieri, dare nomina
as far as it was possible to be done, to give names

medicamentis legitima et congruentia naturæ
to medicines appropriate and agreeable to the nature

cujusque; sic tamen, ut provideremus ne amplificatio
of each; yet so, that we took care lest an extension

titulorum impediat medicos. Si igitur
of the titles should annoy physicians. If therefore

opus fuerit pluribus vocabulis ut designemus
there were occasion for many words that we might express

compositionem rei cujuspiam manifestè
the composition of any thing clearly

in appellando, maluimus apponere ei
in giving it a name, we have chosen to affix to it

simplicius, etsi minùs eruditum cognomen.
a more simple, although a less learned title.

Quod ad nos attinet, detrectavimus nihil
As far as relates to ourselves, we have spared nothing

laboris quo ederemus librum hunc
of exertion by which we might send forth this book

quàm perfectissimum. Non ità, tamen, ut confidamus
as perfect as possible. Not so, however, that we believe

nos esse satisfacturos omnibus, vel admississe
we shall satisfy every one, or that we have admitted

errores nullos; quos siquis voluerit
no errors; which if any person should have a mind

notare asperiùs, reputet modò quantum et
to criticise too harshly, let him only consider how much both

varietatis et difficultatis opus hujusmodi
of diversity and difficulty a work of this kind

amplectitur, et speramus non offensum iri
embraces, and we trust that he will not be displeased

paucis maculis.— Sed hæc hactenus.
with a few blemishes.—But enough of these matters.

Quædam, vero, obnixiùs excusanda sunt,
Some names, however, are to be more earnestly excused,

quæ videantur aut discedere plus quàm
which seem either to depart more than

est satis ab usu populari, ut *Anthemis*, aut
is necessary from popular custom, as Anthemis, *or*

sonare quid horridum ac barbarum, ut
to sound somewhat disagreeable and barbarous, as

Potassa. Tamen restitimus diù :
Potassa. *Nevertheless we hesitated a good while:*

sed quid potuimus facere contra autoritatem
but what were we able to do against the authority

omnium Physicorum, aut quî
of all natural Philosophers, or how (*were we able*)

retinere ea nomina Animalium, Herbarum,
to retain those names of Animals, Herbs,

Lapidumve, quæ scriptores principes in eo genere
or Stones, which the principal writers in that class

imposuerant rebus omninò diversis ?
had applied to things altogether different ?

Igitur putavimus esse satiùs
We have, therefore, thought that it is better

nos incurrere in crimen ingenii rudis,
we should run into the fault of barbarous ingenuity,

quàm admittere aliquid anceps, et
than that (*we*) *should admit any thing uncertain, and*

dubiæ significationis, aut dissentire
of a doubtful signification, or should differ

voca unâ atque alterâ ab universâ consuetudine
in one word or the other from the common custom

chemicorum.
of chemists.

Quod attinet ad mutationem quam
As far as relates to the change which

instituimus facere in Mensuris liquidorum,
we have determined to make in the Measures of liquids,

non est cur timeamus ne existimetur
it is not because we are afraid lest it should be thought

fieri studio novitatis, cum ea
to be done from the study of novelty, since it

dudum efflagitata fuerit ab omnibus. Idem nomen
has long since been desired by every one. The same name

dari mensuræ liquidorum, idem ponderi
given to the measure of liquids, (*and*) *the same to the weight*

solidorum, frequentissimè induxit errorem. Autem
of solids, has most frequently led to error. But

non ausi sumus mutare illam mensuram nomen
we have not presumed to change that measure the name

cui est *Congio*, et capacitas cujus
to which is Gallon, *and the capacity of which*

præscripta est à Rege et Senatu, sed
has been defined by the King and Parliament, but

duximus non modò esse licitum sed
we have concluded that it is not only lawful but (*part*)

officii nostri dividere in partes, pro arbitrio, et
of our duty to divide (*it*) *into parts, at discretion, and*

assignare unicuique titulum.
to assign to each a title.

Quod superest, speramus nos adhibuisse
As far as remains, we trust that we have adhered to

eam rationem in perficiendo hoc opere, quæ
that method in completing this work, which

sit accommodatissima rei tractandæ.
may be best suited to the subject treated upon.

Præmia suavissima laboris et curarum
The most agreeable rewards of (*our*) *labour and anxieties*

certè comparabuntur nobis, si hæc,
will certainly be conferred upon us, if these things,

qualiacunque sint, conducant utilitati publicæ, et vel
such as they are, contribute to the public good, and also

videantur præstare hoc, ut remedia
appear to accomplish this, that (while) remedies

morborum, paulò certiora, indicentur,
of diseases, a little more certain, are pointed out,

morbi ipsi paulò certiùs mitigentur.
diseases themselves are somewhat more speedily relieved.

INTRODUCTION.

THE object of chemistry is to arrive at the elementary or component parts of bodies, and by a reunion of these parts to form a variety of compounds, some of which are presented to us by nature, while others are altogether unknown, except as artificial productions.

That branch of chemistry, which is subservient to the purposes of medicine, is termed *Pharmaceutical Chemistry.* " To chemistry the science of medicine has long been under the deepest obligations. The most efficient remedies have for many years been derived from mineral substances, which have undergone those purifications and ameliorating combinations, which chemistry alone can devise and execute. But the same powerful science is probably about to work a further change: numerous experiments have within the last fifteen years been made upon the most powerful of the vegetable tribe in the *Materia Medica,* and from these it would seem that it is possible, in very many cases, to separate the active medical principle from the ligneous and inert matter by which it is accompanied, and to present it in a pure crystalline form. By this process two objects of considerable importance are attained; the one, that the woody matter, which (as in the case of bark) frequently disordered the stomach, is got rid of; and the other, that the uncertainty as to the strength of dose, which in vegetable substances varied greatly, is altogether obviated. There are also other minor advantages of portability, &c., which are by no means unworthy of attention in a question of such extensive public importance." (*Ency. Met.*)

Of Chemical and Mechanical Action.

Chemical action is only exerted at insensible distances, and is always distinguished by some striking change being observable when the particles of dissimilar bodies, that have the power of acting upon each other, are brought in contact under circumstances congenial to such action:—thus, two liquids often produce a solid; two solids, a liquid; two gases, a solid; two solids, a gas. Colour is at one time produced; at another, destroyed. Increase or diminution of temperature is occasionally manifested to a considerable extent. Two bodies, which in themselves possess no deleterious properties, frequently give rise to a poisonous compound; while, on the other hand, two bodies possessing very energetic properties, often form a compound perfectly inert. Chemical action is influenced by *Attraction*, *Caloric*, *Light*, and *Electricity*.

Mechanical action takes place between all kinds of matter, and at apparent distances. It is accompanied with sensible motion; and although it may alter the forms of bodies, it produces no change whatever in their original composition.

When bodies are chemically united, they are said to be in a state of *combination;* when mechanically added to each other, they are then said to be in a state of *mixture.*

Bodies chemically combined cannot be separated by any mechanical means; their disunion is only to be effected by some new order of chemical action.

Analysis and Synthesis.

Analysis or *decomposition* is the separation of a compound substance into its elementary or component parts. *Synthesis* is the reunion of these parts so as to form the original compound; and whenever it can be effected, it proves the truth of the previous analysis.

Analysis is either *proximate* or *ultimate:* if we separate marble into *carbonic acid* and *lime,* we perform proximate analysis; if we proceed further, and resolve the carbonic acid into *oxygen* and *carbon,* and the lime into *oxygen* and *calcium,* we then perform ultimate analysis, or arrive at bodies incapable of being decomposed—such bodies are called *simple* or *elementary.* It does not, however, follow, that because a body is at present regarded as elementary, it may not hereafter be decomposed. The number of elementary bodies amounts to 53, which are as follows:*—

Oxygen *Azote, or Nitrogen* *Hydrogen* *Chlorine*	Elementary gases.
Sulphur *Carbon* *Phosphorus* *Boron* *Iodine* *Selenium*	Non-metallic solids.

Bromine—Liquid at ordinary temperatures.
Fluorine—A supposed element.

Metals.

Gold, Silver, Iron, Copper, Mercury, Lead, Tin, Antimony, Zinc, Bismuth, Arsenic, Cobalt, Platinum, Nickel, Manganese, Tungsten, Tellurium, Molybdenum, Uranium, Titanium, Chromium, Columbium, Palladium, Rhodium, Iridium, Osmium, Cerium, Potassium, Sodium, Barium, Strontium, Calcium, Cadmium, Lithium, Silicium, Zirconium, Aluminium, Glucinium, Yttrium, Thorium, Magnesium.

All the metals are solid at ordinary temperatures except mercury.

* The elements of the ancients were *Air*, *Earth*, *Water*, and *Fire*.

Attraction.

Attraction is that power or property of matter by which one body is drawn towards or united to another. It may be divided into five kinds:—the *attraction of gravitation*, and *electric* and *magnetic attraction*, acting at sensible distances; the *attraction of aggregation*, or *cohesion*, and *chemical attraction* or *affinity*, acting at insensible distances.

The *attraction of gravitation* causes all bodies composing the universe to have a mutual tendency to approach each other, at whatsoever distance they may be placed, and under certain restrictions it is the cause of planetary motion. It is owing to this attraction that bodies thrown from the earth fall again in straight lines to the nearest point of its surface, which is in a direction towards its centre.

The *electric* and *magnetic attractions* take place at sensible distances, but only within a limited range.

The *attraction of aggregation* or *cohesion* unites similar particles of matter so as to form a mass; *chemical attraction* or *affinity* unites dissimilar particles so as to form a compound: thus, a mass of marble consists of an infinite number of particles, which are held together by cohesion; but the carbonic acid and lime, constituting these particles, as well as the mass itself, are united by affinity.

These apparently different kinds of attraction are supposed by most philosophers to be merely one kind acting under different modifications.

Single elective Affinity.

One body has not the same degree of affinity towards several others, but it attracts them unequally: for instance, if we pour dilute muriatic acid upon marble, which is composed of carbonic acid and lime, the lime combines with the muriatic acid in preference to the carbonic; the latter being thus liberated is expelled in a gaseous state, and a new compound, *muriate of lime*, is formed in solution. If we add sulphuric acid to the solution of muriate of lime, the lime will then attract that acid in preference to the muriatic, *sulphate of lime* will be formed and precipitated, and the muriatic acid will be set free. It is, therefore, evident, that, of the three acids in question, lime has the greatest affinity for the sulphuric and the least for the carbonic. From a choice or election thus manifesting itself, the affinity is called *elective*. In all cases of single elective affinity, one compound is decomposed, and one new compound formed.

Although this kind of affinity appears very simple, yet there are a number of causes or counteracting forces by which it may either be modified or entirely subverted—these are *cohesion*, *insolubility*, *specific gravity*, *efflorescence*, *quantity of matter employed*, *elasticity*, *light*, *heat*, and *electricity:* and notwithstanding our being able to demonstrate that one body is attracted unequally by a number of other bodies, yet we have no means of estimating the comparative degree of force by which it is respectively attracted.

Double elective or complex Affinity.

Double elective affinity is when two compounds mutually act upon each other, and give rise by an interchange of affinities to two new compounds; for example, if we add solution of sulphate of soda to muriate of lime, the sulphuric acid of the sulphate unites with the lime of the muriate, forming *sulphate of lime* which is precipitated; and the muriatic acid of the muriate unites with the soda of the sulphate, forming *muriate of soda* in solution, which may be elucidated as follows:—

Muriate of soda

Sulphate of soda	Soda	Muriat. acid	Muriate of lime
	Sulph. acid	Lime	

Sulphate of lime.

We must not, however, infer that the decomposition takes place in consequence of the sulphuric acid having a greater affinity for lime than soda, or the muriatic acid attracting soda more powerfully than lime, because this is not the case; for if we add either lime-water or muriatic acid separately to solution of sulphate of soda no decomposition is effected. Mr. Kirwan calls the affinities which unite muriatic acid with lime, and sulphuric acid with soda, *quiescent affinities;* and those which unite sulphuric acid with lime, and muriatic acid with soda, *divellent affinities;*

and he supposes the decomposition to take place in consequence of the force of the divellent affinities being superior to that of the quiescent affinities:—this explanation, it is to be observed, does not hold good in all cases of double decomposition.

Solution is when a solid is taken up by a liquid and the compound remains transparent. When a solid dissolves in water, it most commonly happens that cohesion is destroyed without any chemical change being effected; but when solution takes place in other *menstrua*, it is commonly at the expense of decomposition: for example, if marble be placed in dilute muriatic acid it disappears, but the clear liquor is not a solution of *carbonate* but *muriate* of lime. Solution cannot take place unless there be an affinity between the solvent and the solid acted upon—the reason that oil, mercury, chalk, sand, &c. do not dissolve in water, is, that there is no affinity between water and such bodies. Hot water will in general dissolve more of a substance than cold; but some bodies, as common salt, are almost equally soluble in cold and hot water, and lime is more soluble in cold water than hot. Water does not dissolve all bodies in the same proportion, for while some substances are readily soluble in it, others are only very sparingly so: the same may be observed in respect to other *menstrua*. Water is capable of holding several different substances in solution at the same time, provided such substances have not the power of decomposing each other; and it sometimes happens that the solvent power of water is increased in respect to one body, in consequence of two bodies combining in a state of solution.

Gases are soluble to a certain extent in water at its ordinary temperature; but when the latter is raised to the boiling point, they are expelled without change.

Saturation and *neutralization.* — Water affords an example of saturation when it has taken up as much of any body as it can dissolve; muriatic acid of neutralization when it ceases to act upon marble.

Precipitation is when a body is thrown down in a solid form from a state of solution by the addition of some other body. It enables us to obtain substances in a more minute state of division than can be accomplished by any mechanical means.

Effervescence is the escape of a gas through a liquid.

Deliquescence and *efflorescence.*—If a solid substance attract water from the atmosphere when exposed to it, and assume a liquid form, it is said to be *deliquescent;* if a solid substance exposed to the atmosphere lose its form and crumble into powder in consequence of parting with water, it is then said to be *efflorescent.*

Crystallization.—Sometimes it happens that the particles of bodies in going from a liquid or gaseous state, arrange themselves in a certain order, and give rise to solids of peculiar forms termed *crystals.* It has been noticed that certain of these forms are peculiar to certain bodies, so that we are enabled to distinguish one kind of substance from another by its crystalline structure. In a treatise like this, it would be impossible to consider this part of the subject through all its bearings, as *crystallography* of itself forms a distinct science.

To enable a body to crystallize, it must be brought into a liquid or aëriform state; thus, if we dissolve certain substances in water, and then get rid of a portion of the water by evaporating the solution, we obtain crystals more or less regular in their structure; some of the metals crystallize in cooling from the state of fusion; and benzoic acid and other bodies condense in a crystalline state in cooling as in the process of sublimation. In the case of solution, if the evaporation be conducted rapidly by the aid of heat, a confused crystalline mass will be the result; but if the evaporation take place slowly, regular crystals will be formed: the slower the evaporation, the more regular will be the crystals; so that the most perfect crystals are obtained by spontaneous evaporation.

Some bodies during the act of crystallizing from a state of solution, carry down with them a portion of water, which is called *water of crystallization;* this differs in quantity in the crystals of different bodies, but it is always the same in the crystals of the same body, and is therefore chemically combined. When crystals of this kind are exposed to heat, they undergo what is called *watery fusion,* the crystallized body, if soluble, becoming dissolved in its own water of crystallization. Such crystals are entirely deprived of their water by exposing them to a red heat.

The crystals of some bodies are devoid of water of crystallization; but they may nevertheless contain water, which becomes inclosed mechanically as the crystallization proceeds. When crystals of this kind are heated, the water within them expands, and they decrepitate or burst with a crackling sound, but they do not undergo *watery fusion*.

Permanent crystals are those which retain their form when exposed to the air; *efflorescent* and *deliquescent* crystals lose their form when similarly exposed, as explained above, and should be preserved in closely stopped bottles.

ON THE COMBINATION OF BODIES.

1. Some bodies, such as alcohol and water, sulphuric acid and water, nitric acid and water, &c. unite in all proportions.

2. Some bodies unite in all proportions as far as a certain point: thus, water will dissolve any quantity of common salt, less than that which it is capable of holding in solution when fully saturated. At the point in question all further combination of salt with water ceases, in consequence of the greater affinity which then subsists between the particles of salt, than between the particles of salt and water, or in other words, the force of cohesive attraction then becomes superior to that of affinity.

3. Some bodies only unite in certain proportions, or in multiples of those proportions: thus, 8 is the smallest proportion by weight in which oxygen combines with the other elementary bodies, all of which

have also their own combining proportion, that of hydrogen being 1, chlorine 36, azote 14, mercury 200, &c., as shewn in the table of atomic weights in the *Appendix*. We consequently find that 8 parts of oxygen combine with 1 part of hydrogen forming *water*, with 36 of chlorine forming *protoxide of chlorine*, with 14 of azote forming *nitrous oxide*, and with 200 mercury forming *oxide of mercury*;—1 part of hydrogen combines with 36 of chlorine forming *muriatic acid*;—36 parts of chlorine with 200 of mercury forming *chloride of mercury*, &c.: and if one body can combine with another in more proportions than one, then the second and succeeding combinations will be multiples of the first: for instance, there are two compounds of mercury and oxygen which are constituted as follows:—

	Mercury.		Oxygen.	
Protoxide of mercury	200	+	8	The oxygen being as 1 and 2.
Peroxide of mercury	200	+	16	

Chlorine and mercury also form two compounds:—

	Mercury.		Chlorine.	
Protochloride of mercury	200	+	36	The chlorine being as 1 and 2.
Perchloride of mercury	200	+	72	

It is here seen that the same proportion of mercury combines with chlorine as with oxygen.

The same order of combination in multiple proportions is beautifully exemplified in the combinations of oxygen with azote:—

	Azote.		Oxygen.	
Nitrous oxide........	14	+	8	The oxygen being as 1,2,3,4, and 5.
Nitric oxide..........	14	+	16	
Hyponitrous acid....	14	+	24	
Nitrous acid	14	+	32	
Nitric acid	14	+	40	

The combining proportions of compound bodies are always equal to the sum of those of their component parts: for instance, the combining proportion of nitric acid is 54, because 14 + 40 as above, is equal to 54; and if compound bodies unite in more proportions than one with other bodies, the multiple proportions are observable. The combining proportion of oxalic acid is 36; that of potash 48; and these form three compounds:—

	Potash.		Oxalic acid.	
Oxalate of potash	48	+	36	The acid being as 1, 2, and 4.
Binoxalate	48	+	72	
Quadroxalate	48	+	144	

A regular succession of multiples does not occur in all cases of this order of combination, though at the same time it is to be observed, that what is at present wanting in this respect may be supplied by future discovery: thus, a compound consisting of 48 potash and 108 oxalic acid, may hereafter be met with, which would then make the acid in the compounds of these two bodies as 1, 2, 3, 4, instead of 1, 2, 4, as above.

One or two examples are necessary to elucidate moie fully what has been said on the combining proportions of bodies. Water consists of 8 parts oxygen and 1 part hydrogen; now suppose we attempt to form it by adding 8 parts oxygen to 3 parts hydrogen, we shall find that 8 parts oxygen will only combine with 1 part hydrogen, forming the liquid in question, and that 2 parts hydrogen will remain in its pure state; and if we reverse the experiment, the combination will be the same, and the excess of oxygen will then be unacted upon.

The mutual decomposition of neutral salts that are capable of acting upon each other in solution, affords a very striking instance of the manner in which bodies observe their constant combining proportions. Let us take *acetate of lead* and *sulphate of soda* as an example: by looking in the table in the Appendix, we find 162 opposite the former salt, and 72 opposite the latter; 162 parts therefore of acetate of lead decompose 72 parts of sulphate of soda:—

Acetate of soda 82.

Acetate of lead 162	Acetic acid 50	Soda 32	Sulphate of soda 72
	Oxide of lead...... 112	Sulphuric acid...... 40	

Sulphate of lead 152.

The above diagram explains, that after the decomposition has taken place, the 112 parts of oxide of lead, previously combined with the acetic acid, have united with the 40 parts of sulphuric acid previously combined with the soda, and that the 32 parts of soda have combined with the 50 parts of acetic acid, giving rise to 152 parts of sulphate of lead, and 82 parts of acetate ~~sulphate~~ of soda. Not a particle of either salt is left unacted upon; but if more of either salt were added, than is necessary to produce the exact decomposition of each, such excess would remain unchanged after the decomposition has taken place.

In different works on chemistry we find different numbers employed to express the composition of bodies; but it is immaterial what numbers are employed, provided the exact relation between them be observed. Dr. Thomson makes oxygen 1, Dr. Wollaston 10, Berzelius 100, Dalton and others 8; but whether we say that water is composed of oxygen 1 and hydrogen 0.125, according to Thomson, or of oxygen 8 and hydrogen 1, according to Dalton, the relation is the same, and so of other bodies. The last series of numbers alluded to is perhaps the most eligible, from its not being burthened with fractional parts.

The terms *proportion*, *combining proportion*, *equivalent*, *proportional*, *atom* and *atomic* weight, are all synonymous: the two last are employed throughout the following pages merely for the sake of brevity, but in some instances they may appear objectionable, because as they imply the very smallest proportion in which a body combines, the expression of *half an atom*, or *an atom and a half* is inconsistent. This is mentioned in relation to the oxides of antimony, page 124, those of iron, page 138, those of lead, page 161, &c.

When the student understands that the elementary or component parts of compound bodies always exist in the same proportion, a new field of inquiry will be opened to his view, his analytical labours will be materially facilitated, and he will perceive the basis on which chemistry rests as *a science*. The atomic weights or combining proportions of bodies, are now to be found in almost all treatises on chemistry, arranged in the form of tables similar to that contained in the Appendix; and their use in determining the quantity of each component in any given weight of a compound will become evident by a few examples.

Suppose it be required to know how much pure lime exists in a precipitate of sulphate of lime weighing 230 grains. By turning to the table of atomic weights, we find opposite sulphate of lime 68, that compound consisting of 1 atom of sulphuric acid, which by the same table we find to be 40, and 1 atom of lime, which is 28:—

Sulphate of lime 68	1 atom sulphuric acid....	40
	1 atom lime..............	28
		68

Then, to ascertain how much lime is contained in the 230 grains, we have only to state,

As 68 : 28 :: 230 : 94.7

If a precipitate of chloride of silver weigh, when dried, 118 grains, the quantity of pure silver it contains is at once estimated; for, by turning to the table, we find chloride of silver to consist of

1 atom chlorine..........	= 36
1 atom silver............	= 110
1 atom chloride of silver	= 146

Then,

As 146 : 110 :: 118 : 88.9

Supposing it be required to determine the quantity of real acid in a sample of any acid more or less dilute; if the acid form a soluble salt with lime, we may ascertain this from the quantity of marble (*carbonate of lime*) necessary to neutralize it—Thus, muriatic acid forms a soluble salt with lime; and the number of grains of a given quantity of carbonate of lime dissolved in a given quantity of muriatic acid multiplied by .74 gives the number of grains of dry acid in the quantity employed; for, as the atomic weight or equivalent number of carbonate of lime is 50, and that of muriatic acid only 37, it is evident that muriatic acid decomposes .74 of its weight of marble, for 37 divided by 50 = .74. When we wish to ascertain the strength of nitric acid in a similar way, we then multiply the number of grains of marble dissolved by 1.08, and that gives the quantity of dry nitric acid in the quantity of liquid acid employed in the experiment: here, 54 being the weight of atom of dry nitric acid, and 50 that of carbonate of lime, the nitric acid neutralizes its own weight, and 0.8 more, for 54 divided by 50 = 1.08, and hence the necessity of multiplying by that quotient. This method of determining the strength of acids is particularly applicable to acetic acid, because the specific gravity of that acid forms no criterion of its strength; and it is well established that it dissolves, or rather decomposes, its own weight of carbonate of lime. Therefore, if we put a given quantity of small lumps of marble (but it must not be in powder), say 300 grains, into a flask, and add to it a given quantity of a sample of any kind of vinegar, for instance, 1000 grains; and after the solution has become neutral, care being taken to drive away the carbonic acid by warming it, if we pour it off, and wash the marble remaining, this, when dried and weighed, will enable us to ascertain the quantity of dry acid by the quantity it has lost in weight: thus, if 110 grains of marble have disappeared, the 1000 grains of vinegar contained 110 grains of dry or real acetic acid.

The table of atomic weights may be applied in a variety of other ways, which a knowledge of the theory of numbers, combined with practical experience, will continually point out. It may be necessary to observe, that the combining proportions of some bodies have, perhaps, not yet been accurately determined; therefore, whenever a number is corrected by respectable authority, it will be necessary to alter the number in the table accordingly.

Much amusement, as well as information, will be derived from *Dr. Wollaston's Scale of Chemical Equivalents*, which may be purchased at any mathematical instrument maker's, with a description of its construction and use; but as this scale does not determine the component parts of bodies with a great degree of accuracy, it will be necessary to resort to calculation, when we wish to approach as near as possible to the truth.

Combination by volume. Gay-Lussac was the first to prove that gaseous bodies unite together by volume in definite quantities, and the subject has been taken up by Humboldt, Berthollet, and others. The multiple proportions are also as observable in this order of combination as in the combination of bodies by weight; examples in elucidation of this will be met with in the combinations of oxygen with azote, page xliii, and those of other gases, which unite in more proportions than one. Vapours observe the same law in combining, and it is believed that solids which are fixed in the fire would also be subject to it, if they could be brought into an aëriform state.

OF THE ELEMENTARY PONDERABLE BODIES AND THEIR COMPOUNDS.

A list of the elementary ponderable bodies is given at page xx. It will now be necessary to consider these in their separate states, and under the varieties of combination into which they are capable of entering. Amongst other properties appertaining to the physical nature of ponderable bodies, and which ought to be well understood, is *specific gravity*, which is the weight of a body compared with that of another, taken as a standard, the magnitude of each being the same; thus, a cubic inch of water, mercury, gold, and marble, differ materially in point of weight, that is, the densities of each of these bodies differ in consequence of their including different quantities of ponderable matter within the same space. Water, at the temperature of 60° F. is the standard of comparison in taking the specific gravity of liquids and solids; and atmospheric air at 60° F. is the standard by which the specific gravity of gaseous bodies is estimated. The pressure of the atmosphere materially influences the weight of some bodies, and consequently regard must be had to pressure as well as temperature. That pressure is agreed upon as a standard which elevates the column of mercury in the barometer tube to 30 inches. Should the temperature exceed or fall short of 60°, or the mercury not be at the required height in the barometer tube, allowance must be made according to those rules which are to be met with in all chemical works of eminence, in which also the manner of taking the specific gravity of different bodies is described.

Oxygen.

Oxygen gas was discovered by Dr. Priestley in 1774, and soon after by Scheele, who was unacquainted with Priestley's discovery. It was called *dephlogisticated air* by Priestley, *empyreal air* by Scheele, and *vital air* by Condorcet; Lavoisier believing it to be the sole cause of acidity gave it its present name, which is derived from ὀξὺς, *acid*, and γεννάω, *I generate*. This name, however, is erroneous, since more modern discovery has proved that several acids are altogether devoid of oxygen; notwithstanding, it is still agreed to retain it, to prevent the confusion that would necessarily arise in chemical nomenclature from adopting one more appropriate.

Oxygen gas may be obtained from the red oxide of mercury,* from some of the oxides of other metals, and from chlorate and nitrate of potash, by means of heat. A gun-barrel, an iron or earthenware retort, and, when a very strong heat is not required, a glass retort may be employed for containing the materials to be acted upon. In the mouth of the gun-barrel or retort a tube of flexible metal should be inserted air-tight, by means of a piece of cork, or some sort of luting, such as glazier's putty. Then the end of the retort containing the materials being placed in a common fire, and the mouth of the flexible tube being made to dip into a vessel of water, a bottle filled with water is to be inverted over the end of the tube, and as the gas comes over it will rise and expel the water out of the bottle.

The red oxide of mercury is composed of 2 atoms oxygen and 1 atom mercury; by submitting it to a red heat, the 2 atoms of oxygen are expelled in a gaseous

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* Priestley first obtained oxygen gas by acting upon the red oxide of mercury with the heat obtained by a burning lens.

weight of a body compared with that of another, taken as a standard, the magnitude of each being the same; thus, a cubic inch of water, mercury, gold, and marble, differ materially in point of weight, that is, the densities of each of these bodies differ in consequence of their including different quantities of ponderable matter within the same space. Water, at the temperature of 60° F. is the standard of comparison in taking the specific gravity of liquids and solids; and atmospheric air at 60° F. is the standard by which the specific gravity of gaseous bodies is estimated. The pressure of the atmosphere materially influences the weight of some bodies, and consequently regard must be had to pressure as well as temperature. That pressure is agreed upon as a standard which elevates the column of mercury in the barometer tube to 30 inches. Should the temperature exceed or fall short of 60°, or the mercury not be at the required height in the barometer tube, allowance must be made according to those rules which are to be met with in all chemical works of eminence, in which also the manner of taking the specific gravity of different bodies is described.

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The red oxide of mercury is composed of 2 atoms oxygen and 1 atom mercury; by submitting it to a red heat, the 2 atoms of oxygen are expelled in a gaseous

* Priestley first obtained oxygen gas by acting upon the red oxide of mercury with the heat obtained by a burning lens.

form, and the mercury is reduced to the metallic state.

There are 3 oxides of manganese, which are composed as follows;—

	Manganese.		Oxygen.	
Protoxide ..	1 atom = 28	+	1 atom = 8	= 36
Deutoxide ..	1 —— = 28	+	$1\frac{1}{2}$ —— = 12	= 40
Peroxide....	1 —— = 28	+	2 —— = 16	= 44.

When the peroxide is heated to redness, 4 parts or ½ an atom * of oxygen are liberated in the state of gas, and the deutoxide of manganese remains in the retort, after oxygen ceases to come over.

By heating the powdered peroxide of manganese in a glass retort, with about its weight of strong sulphuric acid, by means of a spirit-lamp, we also obtain oxygen; the theory of the process is explained in the following manner:—

$$\begin{array}{c}\text{Peroxide of}\\ \text{manganese}\\ 44\end{array}\left\{\begin{array}{l}\text{Oxygen 8 } \textit{gas}\\ \underbrace{\text{Protoxide of manganese 36} \qquad\qquad \text{Sulphuric acid 40}}_{\text{Sulphate of manganese 76.}}\end{array}\right.$$

It is to be observed that of the three oxides of manganese above enumerated, only the protoxide will unite with sulphuric acid; that acid, therefore, combining with 1 atom of protoxide of manganese liberates

* See page xxxi, respecting the use of this term.

1 atom of oxygen in the state of gas, and 1 atom of *sulphate of manganese* remains in the retort, as shewn by the diagram.

Oxygen gas is obtained in a very pure state from chlorate of potash—this salt is composed of chloric acid and potash, both of which are decomposed by the action of heat;—

	6 atoms oxygen *gas*		
Chloric acid 76	Oxygen 5 atoms = 40	Oxygen 1 atom = 8	Potash 48
	Chlorine 1 atom = 36	Potassium 1 atom = 40	
	Chloride of potassium = 76.		

The 1 atom of chlorine of the chloric acid unites with the 1 atom of potassium of the potash, forming 1 atom of *chloride of potassium*, which remains in the retort; and the 5 atoms of oxygen of the chloric acid, and the 1 atom of oxygen of the potash, are expelled in the state of gas, as shewn by the diagram.

Oxygen gas is devoid of colour, taste, and smell. It is a powerful supporter of combustion and animal life. All combustible bodies burn in it with much greater facility and splendour than in atmospheric air; iron and steel also, which are not combustible under ordinary circumstances, are readily consumed in it. All bodies by burning in this gas acquire an addition in weight, and the gas itself disappears: the increase of weight will always be found equal to the weight of oxygen consumed. Stahl, and some other chemists, ascribed the phenomenon of combustion to a peculiar supposed principle, which they called *phlogiston.* This principle was believed to exist in all bodies of a combustible nature, and combustion was considered the effect of its separation. The discovery of oxygen was the downfal of the *Stahlian* or *phlogistic* theory; and the *anti-phlogistic* theory, which maintains that combustion is nothing more than the combination of oxygen with bodies, soon became universal. The cause of light and heat during combustion has not yet been satisfactorily explained.

An animal will live about three times as long confined in a vessel of oxygen gas, as in another vessel of the same size containing atmospheric air.

By combustion and respiration oxygen becomes altered in its properties, certain compounds being formed which are inimical to combustion and animal life.

Oxygen constitutes about one-fifth of our atmosphere, it forms a considerable part of the mineral substances composing the crust of the earth, is one of the elements of water, and is found in almost all animal and vegetable matter, and is indispensably necessary to the existence of all organized bodies.

As oxygen gas is only very sparingly absorbed by water, it may be collected over that fluid, as already explained, and it may also be collected over mercury.

Oxygen is about one-tenth heavier than atmospheric air, and its atomic weight or combining proportion with other bodies is 8. It enters into combination with all the other elementary bodies, forming either *acids* or *oxides:* the general definition of an acid is given at page 77; the term *oxide* implies a compound containing oxygen, without possessing acid properties. The Greek ordinal numbers are employed to denote the different degrees of oxidation of bodies—thus, *prot*oxide signifies the first oxide, or that containing a minimum of oxygen; *deut*oxide the second oxide; *trit*oxide the third, &c.; and when a body is combined with its maximum, or greatest quantity of oxygen, with which it is capable of uniting, the compound is called a *per*oxide, unless it possess acid properties.

Oxygen is a non-conductor of electricity, and a perfectly negative electric.

Azote or Nitrogen.

Azote was first demonstrated to be a distinct aëriform fluid by Dr. Rutherford, in 1772; and in 1775 Lavoisier, and soon afterwards Scheele, proved it to be one of the ingredients of atmospheric air.

Azote is very readily obtained by burning a piece of phosphorus in a glass jar, filled with atmospheric air, and inverted over water: the phosphorus may be placed on a piece of cork, and allowed to float on the water, and then the vessel of atmospheric air is to be inverted over the phosphorus as soon as it is set on fire. The oxygen of the air in the vessel supports the combustion of the phosphorus, and a white cloud is seen to form, which is phosphoric acid; this, in the course of half an hour, becomes absorbed by the water, over which the experiment is made, and then the azote remains transparent and colourless, but mixed with a little vapour of phosphorus and carbonic acid, both of which may be removed, when pure azote is required, by agitating the mixture with solution of pure potash. After the experiment is concluded, a portion of water is seen to have ascended in the vessel, occupying the space of the oxygen which has disappeared. There are other methods of removing the oxygen from atmospheric air, so as to leave the azote.

Azote may also be obtained by pouring nitric acid of sp. gr. 1.25 upon animal muscle, and exposing the mixture in a retort to a moderate temperature; but the theory of the process is not fully understood.

When quite pure, azote has neither colour, taste, nor smell. It is destructive of animal life * and combustion, and is incombustible. It is only sparingly absorbed by water, and may, therefore, either be collected over that liquid or over mercury. It constitutes about $\frac{4}{5}$ths of atmospheric air, is somewhat lighter than that fluid, its specific gravity being .9722, and its atomic weight is 14. Azote is suspected to be a compound body, but as yet it has resisted all the attempts that have been made to decompose it.

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* *Azote* is derived from *α privative*, and *ζωὴ life*. Its other name, *nitrogen*, was given to it from its constituting the base of *nitric* acid.

Azote and oxygen form *atmospheric air*, and the following five chemical compounds:

	By weight.					By volume.		
	Azote		Oxygen		Weight of atom	Azote		Oxygen
Nitrous oxide.....	14	+	8	=	22	100	+	50
Nitric oxide......	14	+	16	=	30	100	+	100
Hyponitrous acid	14	+	24	=	38	100	+	150
Nitrous acid	14	+	32	=	46	100	+	200
Nitric acid........	14	+	40	=	54	100	+	250

Atmospheric air is composed of $\frac{1}{5}$ oxygen and $\frac{4}{5}$ azote, which are believed to be in a state of mechanical mixture. It is 831 times lighter than water, and 11,260 times lighter than mercury. According to Sir G. S. Evelyn 100 cubic inches when pure and free from moisture at 60° F. and 30 inches barometrical pressure weigh 30.5 grains. Its specific gravity is considered as unity in estimating that of all other gaseous bodies. At the level of the sea, the pressure of the atmosphere is equal to a weight of nearly 15 pounds on every square inch of surface, but as this pressure is the same in all directions we are not sensible to it. In consequence of the force with which the atmosphere presses, it will support a column of water 34 feet high, and a column of mercury 30 inches high; so that a column of air extending from the surface of the sea to the extreme limit of the atmosphere, one of water 34 feet high, and another of mercury 30 inches high, all being of the same lateral dimensions, have the same weight. Galileo was the first to observe the pressure of the atmosphere: his attention was drawn to the subject by noticing that water can only be raised 34 feet by means of a common sucking pump. Toricelli, his pupil, afterwards invented the barometer, an instrument employed to shew the different degrees of pressure of the atmosphere. The barometer is constructed in the following manner:—a glass tube of about 34 inches in length and open at one end, is filled completely with mercury, so as to exclude any atmospheric air; it being then inverted, the mercury above what the pressure of the atmosphere is able to support, runs out, and a vacuum, the most perfect known, is left at the upper part of the tube, which is called the *Toricellian vacuum*. The open extremity of the tube turns up, and is blown into a bulbous form: this retains a portion of mercury in addition to the column sustained in the tube. Now, as the pressure of the atmosphere is greatest at the surface of the sea, and becomes less as we ascend into the air, it is evident that the mercury will fall in the barometer tube in proportion to the distance to which it is removed above the earth's surface; hence the use of the barometer in measuring the elevation of mountains. The pressure of the atmosphere not only varies at different distances from the earth's surface, but also at the same place. On this account the barometer is employed as a weather glass: when the weather is fine and calm, the atmosphere is more dense, and the mercury is pressed out of the bulbous part into the tube; when wet and stormy, the atmosphere is less dense, and some of the mercury consequently descends out of the tube. The cause of the variation of atmospheric pressure at the same place has not yet been explained.

Besides the necessary constituents of atmospheric air already noticed, it always contains variable quantities of watery vapour and carbonic acid gas. Theod. Saussure has observed that the quantity of carbonic acid varies in the air of the same place at very short intervals of time, that it is greater in summer than winter, and, from observations made during spring, summer and autumn, that it is greater at night than in the day. He found that 10.000 parts of air contain 4.9 of carbonic acid as a mean, 6.2 as a maximum, and 3.7 as a minimum. It was formerly believed that the quantity of oxygen in atmospheric air is variable, and that the healthiness of different places depends on the relative quantity of that ingredient; but it appears from more recent analyses that the composition of the air is the same in all places, and at all elevations above the earth's surface. The unhealthiness of air therefore depends not on the absence of oxygen, as was formerly supposed, but on the presence of various noxious principles with which it occasionally becomes impregnated.

As oxygen is continually abstracted from the atmosphere by the respiration of animals, by combustion, putrefaction, and a variety of other ways, without suffering any apparent diminution, it is evident that there exists in nature some constant means of restoring it. The only way at present known by which this is effected is through the medium of the vegetable kingdom. Plants absorb carbonic acid during the day, the carbon of which becomes separated by a certain decomposing process carried on within them, and pure oxygen is exhaled; but during the night vegetables give out carbonic acid, and absorb oxygen. It has been ascertained by Dr. Priestley and Sir H. Davy, that the quantity of oxygen afforded by growing vegetables in 24 hours is greater than that consumed.

Nitrous oxide or *protoxide of nitrogen* is readily obtained by heating nitrate of ammonia in a glass retort by means of a spirit-lamp: the heat should be very gradually applied so as to prevent the gas coming over too rapidly. The theory of the process is as follows:

Nitric acid 54	Azote 14 Oxygen 8	Nitrous oxide 2 atoms = 44	Azote 14 *Oxygen* 8	Ammonia 17
	Oxygen 8			
	Oxygen 8 Oxygen 8 Oxygen 8	Water 3 atoms = 27	Hydrog. 1 Hydrog. 1 Hydrog. 1	

Nitrate of ammonia consists of 1 atom nitric acid and 1 atom ammonia; ammonia of 1 atom azote and 3 atoms hydrogen; nitric acid of 1 atom azote and 5 atoms oxygen. The 3 atoms of hydrogen of the ammonia combine with 3 atoms of oxygen of the nitric acid and form 3 atoms of water; while, of the 2 remaining atoms of oxygen of the nitric acid, 1 atom combines with the azote of the ammonia, the other with the azote of the nitric acid, forming 2 atoms of nitrous oxide.

Nitrous oxide is colourless, it possesses an agreeable odour, and sweet taste. Water, which has been recently boiled, dissolves very near its own bulk of this gas at 60° F. and affords it again in a pure state by boiling: the solution has the same odour and taste as the gas itself. Nitrous oxide may be collected over hot water or mercury. It was first shewn by Sir H. Davy, that this gas may be taken into the lungs with safety, and that it will support respiration for a few minutes. He breathed 12 quarts of it, contained in an oiled silk bag, for a little more than 4 minutes, and found that any larger quantity would not enable him to bear the privation of atmospheric air for a longer period. When inhaled in this way, it produces the most exhilarating effects on the system, accompanied with a strong propensity to laughter, an unusual disposition to muscular exertion, and a rapid flow of lively ideas. These effects do not last long, but on returning to his accustomed state, the person who has inspired it does not experience any of that depression which follows intoxication from wine or spirits. Those who are predisposed to a determination of blood to the head should be cautious how they inhale this gas.

Nitrous oxide is a more powerful supporter of the combustion of most bodies than atmospheric air. It is not inflammable. With an equal volume of hydrogen it forms a mixture which explodes by means of flame or the electric spark, giving rise to the formation of water by the union of oxygen and hydrogen, while azote is set free. The composition of nitrous oxide is given in the table at page xliii. Its sp. gr. is 1.527.

Nitric oxide, nitrous gas, or *deutoxide of nitrogen* is obtained by acting upon nitric acid with several of the metals. The gas is obtained in the greatest purity when copper or mercury is employed for this purpose. The strong acid should be diluted with about twice its weight of water. Supposing copper be employed, the changes which take place during the operation are as follows, and the explanation will serve for any other metal, it only being necessary to substitute the name of such metal in the place of the word *copper* in the diagram, &c.

$$\text{Nitric acid decomposed}\left\{\begin{array}{l}\text{Nitric oxide}\\ \underbrace{\text{Oxygen} \qquad \text{Copper}}_{\text{Peroxide of copper}}\end{array}\right.$$

$$\underbrace{\text{Peroxide of copper} \quad \text{Nitric acid undecomposed}}_{\text{Pernitrate of copper.}}$$

Part of the nitric acid is decomposed by the copper abstracting oxygen therefrom, and *peroxide of copper* is formed, which uniting with the undecomposed portion of nitric acid forms *pernitrate of copper,* the other portion of the decomposed nitric acid being expelled in the state of *nitric oxide,* which may be received over water or mercury.

Nitric oxide is colourless when perfectly pure, but at the instant it comes in contact with oxygen gas or atmospheric air, it is turned of an orange colour in consequence of *nitrous acid* vapour being formed. From this circumstance, nitric oxide may be distinguished from all other gaseous substances, and the presence of oxygen may also be readily determined.

Nitric oxide is destructive of life, and it only supports the combustion of very few bodies. It is not inflammable. Its sp. gr. is 1.0416.

Hyponitrous acid.—This acid has not yet been obtained in a free state. If nitric oxide be kept standing about three months in a glass tube over mercury, concentrated solution of potash being also in the tube, it is converted into hyponitrous acid, which combines with the potash, and nitrous oxide, which remains in the tube. When hyponitrite of potash is decomposed by adding a stronger acid, at the moment the hyponitrous acid is set free it resolves itself into nitrous acid and nitric oxide.

Nitrous acid.—This acid exists in a state of vapour, and in a liquid state without water. From what has been said under *nitric oxide*, the mode of forming nitrous acid in the state of vapour is at once understood. As nitrous acid vapour is rapidly absorbed by water, and acted upon by mercury, it can only be formed and retained in vessels that have been exhausted by the air-pump.

Nitrous acid vapour is of an orange colour. It is destructive of life in its pure state, and is very unwholesome even when breathed moderately diffused through the air of an apartment. It supports the combustion of very few bodies.

Liquid nitrous acid is obtained by thoroughly drying crystallized nitrate of lead, and then submitting it to a low red heat in an earthen-ware retort. By this means the nitric acid of the salt is expelled, and as that acid cannot exist except in combination with a base or with water, at the moment of its separation from the protoxide of lead, it resolves itself into nitrous acid and oxygen; the latter escapes, and the greater portion of the former is condensed by receiving it in vessels kept cool during the process. As thus obtained nitrous acid is in a liquid and anhydrous * state. It possesses the pungent odour and orange colour of the vapour, and is so extremely volatile as to boil at 82° F. which is 14° below the boiling point of sulphuric æther, and it readily assumes the form of vapour when exposed to the atmosphere. Its sp. gr. is 1.451. When mixed with a large quantity of water it is converted into nitric acid and nitric oxide: the latter escapes in the gaseous state; the former unites with water, and a colourless solution is the result. If diluted with only a very small quantity of water, the last mentioned change does not occur, but a green coloured liquid is obtained; and it is also singularly affected when diluted with water in moderate and

* *Anhydrous* signifies *without water.*

successive proportions: the nature of these changes are perhaps not satisfactorily understood.

Nitrous acid is retained in the Edinburgh Pharmacopœia, and its medical uses and dose are similar to those of nitric acid.

Nitric acid.—For the manner of obtaining this acid, &c. see page 85.

Hydrogen.

The nature and properties of this gas were first investigated by Mr. Cavendish in 1766. It was formerly called *inflammable air*, and *phlogiston:* it received the latter appellation from being supposed to constitute the matter of heat. Its present name is derived from ὕδωρ *water*, and γεννάω *I generate*, the propriety of which will immediately be perceived.

Hydrogen gas is always obtained by decomposing water, which may be effected in different ways. Let some iron wire or iron turnings be put in the middle of a gun-barrel open at both ends, and let a glass retort containing water be inserted air-tight in one end, and a bent tube in the other. Place that part of the gun-barrel containing the iron turnings in a furnace, and let the bent tube dip into a water-bath. As soon as the gun-barrel becomes red hot, let the water in the retort be made to boil by means of a spirit-lamp, and as its vapour passes over the red hot iron, it will be decomposed—its oxygen will unite with the iron, and its hydrogen will pass through the bent tube, and may be collected in a vessel filled with water and inverted over the mouth of the tube Be cautious to remove the bent tube out of the water-bath or gun-barrel before taking the spirit-lamp away from the retort, otherwise the cold water will rush out of the bath into the partial vacuum that is formed, and will cause an explosion that might be attended with danger. If a porcelain tube be employed instead of a gun barrel, the composition of water may be determined; for if the increase of weight in the iron, after the operation, be added to that of the hydrogen obtained, a weight equal to the quantity of water consumed will be afforded. But it requires great skill to manage this calculation accurately, although it appears very easy of explanation.

Another way of obtaining hydrogen is by means of iron or zinc (the latter is preferable,)and sulphuric acid diluted with about four times its weight of water. The theory of the process is as follows:—

$$\begin{array}{c} \underset{9}{\text{Water}}\left\{\begin{array}{l}\text{Hydrogen 1 } \textit{Gas} \\ \underbrace{\text{Oxygen 8} \qquad \text{Zinc 34}}_{\text{Oxide of zinc 42}}\end{array}\right. \\ \underbrace{\text{Oxide of zinc 42} \\ \text{Sulphuric acid 40}}_{\text{Sulphate of zinc 82.}} \end{array}$$

The water is decomposed, its oxygen unites with the zinc forming *oxide of zinc*, which combines with the sulphuric acid forming *sulphate of zinc*, this remains in the retort, and the hydrogen of the water is liberated in a gaseous state.

Hydrogen gas, when perfectly pure, is colourless, and has neither taste nor smell, but when obtained as above, it generally possesses a disagreeable odour, owing to the formation of certain compounds which are derived from the impurities of the zinc or iron during the process. Very pure hydrogen may be obtained if distilled zinc be employed.

Hydrogen is destructive of life and combustion, is inflammable, and is the lightest of all the ponderable bodies. Its specific gravity, according to Dr. Prout, is 0.0694; and 100 cubic inches at 60° F. and 30 inches barometrical pressure weigh 2.118 grains. It is only slightly absorbable by water, and may, therefore, be collected over that fluid or over mercury. When a jet of hydrogen gas is brought in contact with a piece of spongy platinum, the latter becomes red hot, and then sets fire to the gas; the cause is not understood.

Hydrogen and *oxygen* form two compounds, *water* and the *deutoxide* or *peroxide of hydrogen*.*

Water.—When 2 volumes of hydrogen and 1 volume of oxygen are placed in a proper apparatus, and the electric spark is passed through the mixture, the two gases unite, and water is formed. If the experiment be made over mercury, the condensation of the gases becomes evident by the mercury rising in the tube in which the detonation has been effected; and if excess of either gas be employed, such excess will remain unacted upon as explained at page xxx. Water is also

* Those compounds which are unimportant in a pharmaceutical point of view will not be brought under consideration.

formed by burning hydrogen gas in a vessel containing pure oxygen, and the quantity produced is equal to the weight of oxygen and hydrogen that disappears. The mode of determining the composition of water analytically has already been shewn at page lii. Water is found to consist of 1 atom oxygen and 1 atom hydrogen; or of 1 volume of the former and 2 volumes of the latter.

A mixture of hydrogen and oxygen or atmospheric air, may also be made to explode by flame, or by means of a piece of spongy platinum, and water is the result. Water is also afforded by the combustion of hydrogen in atmospheric air. It is to be observed that the explosiveness of a mixture of hydrogen and oxygen under all circumstances depends upon the relative quantities of each ingredient: when the quantity of oxygen is too great to admit of explosion by flame, electricity, or spongy platinum, combination in due proportions may then be silently effected through the medium of the last two mentioned agents, or by submitting the mixed gases to a temperature above that of boiling mercury.

Water refracts light powerfully, conducts heat slowly, and electricity imperfectly. It is only very slightly compressible when submitted to very great pressure. Its specific gravity is unity in comparison of that of all solids and liquids, and its weight is 831 times greater than that of atmospheric air. The manner in which it is affected by the action of caloric is explained in speaking of that agent. With some bodies, water, as already explained, will unite in all proportions; with others, it unites in all proportions to a certain extent; but with certain bodies, it only combines in definite proportions, forming compounds which are called *hydrates*, several of which are noticed in the following pages. Water when recently boiled has the property of absorbing a portion of all gases, but some gases are considerably more absorbable by it than others. It is not found in a perfectly pure state in nature; but the purest is rain-water collected as described at page 211, or that obtained by melting fresh fallen snow.

Hydrogen and azote.—The only compound of these at present known is *ammonia*, the manner of procuring which, both in a gaseous state and in solution in water, is explained at page 94.

Chlorine.

The discovery of this gaseous body was made by Scheele in 1770, while experimenting on manganese. He called it *dephlogisticated marine acid*, and it afterwards received the name of *oxygenized muriatic acid*, and *oxymuriatic acid*, in consequence of its being supposed to consist of muriatic acid and oxygen. Gay-Lussac, and Thénard in 1809 began to consider it a simple body; and Sir H. Davy, about the same period, succeeded in proving that it was so. This gave rise to what is called the *new theory of chlorine*, which at first was only slowly admitted, but which has now become almost universally established.

To obtain chlorine, put some black oxide (peroxide) of manganese into a glass retort, with twice its weight of concentrated muriatic acid; the decomposition which immediately begins to take place will be facilitated by applying the heat of a spirit-lamp:

$$
\begin{array}{llll}
 & & \text{Chlorine } 36 & \\
 & \multicolumn{2}{c}{\overbrace{\text{Water } 9}} & \\
\text{Peroxide of manganese } 44 & \left\{\begin{array}{l}\text{Oxygen } 8 \\ \text{Protoxide of manganese } 36\end{array}\right. & \left.\begin{array}{l}\text{Hydrogen } 1 \\ \\ \end{array}\right\} & \text{Muriatic acid decomposed } 37 \\
 & & \text{Muriatic acid undecomposed } 37 & \\
 & \multicolumn{2}{c}{\underbrace{\qquad\qquad}_{\text{Protomuriate of manganese } 73.}} &
\end{array}
$$

The above diagram represents, that part of the muriatic acid is decomposed, its hydrogen uniting with 1 atom of oxygen of the peroxide of manganese, and forming 1 atom of *water*, and its chlorine escaping in the state of gas, while the muriatic acid undecomposed unites with the protoxide of manganese, forming *protomuriate of manganese*, which remains in the retort.

Chlorine may also be procured by acting upon a mixture of three parts by weight of common salt, and one part of peroxide of manganese, with two parts of sulphuric acid, and one part of water. In this case, muriatic acid, instead of being directly added as before, is formed during the process, by the action of part of the sulphuric acid on the common salt, as explained at page 84, while another portion of the sulphuric acid acts upon the peroxide of manganese as explained in the diagram at page xxxviii, causing 1 atom of oxygen to be liberated from that substance, which uniting with the hydrogen of the muriatic acid, as in the former case, water is generated, and the chlorine of the muriatic acid escapes in the state of gas. By this method *sulphate of soda* and *sulphate of manganese* are left in the retort, but no muriate of manganese is formed, the *whole* of the muriatic acid being decomposed in the manner explained. The latter way of procuring chlorine, being cheaper than the former, is resorted to when chlorine is required on the large scale for the purposes of bleaching, &c.

Chlorine is a greenish-coloured gas, whence its name;* it has a very disagreeable, peculiar smell, and astringent taste, is powerfully destructive of life, and produces a most suffocating effect even when inhaled in a state of very great dilution with atmospheric air. Like most other gases which prove fatal by inhalation, it acts by producing spasm as well as irritation of the glottis. It is considerably heavier than atmospheric air, its sp. gr. being about 2.5 : 100 cubic inches, according to Dr. Thomson, weigh 76.25 grains, at the standard temperature and barometrical pressure. Its atomic weight is estimated at 36. When submitted to a pressure equal to that of about 4 atmospheres, it becomes a limpid, bright yellow-coloured liquid; but on the pressure being removed, it again assumes its gaseous form. It unites with some bodies, giving rise

* From χλωρος, *green*.

to acid compounds, while with others it forms a class of compounds devoid of acid properties, called *chlorides*, or *chlorurets:* the different proportions of chlorine in the latter are denoted by prefixing the Greek numerals after the manner explained when speaking of *oxides.*

Chlorine has not the least pretensions to rank with acids, it being neither characterized by a sour taste, nor by an acid reaction on vegetable blues, nor does it, like acids, unite with alkaline bases or metallic oxides to form salts; but it combines directly with metals, contrary to the nature of acids.

In combination with water, chlorine possesses powerful bleaching properties, rapidly and permanently destroying all animal and vegetable colours; but it is devoid of these properties in a perfectly dry state. During the bleaching process chlorine unites with the hydrogen of the water, forming muriatic acid, while the oxygen of the water transfixes itself to the colouring matter, which it decomposes.

Chlorine ranks as a supporter of combustion: when metallic arsenic, antimony, copper, zinc, and some other metals are introduced into a vessel of chlorine gas in the state of leaf or powder, a chloride of the metal is formed on the instant with evolution of heat and light. A piece of potassium or phosphorus also takes fire spontaneously in this gas, *chloride of potassium*, or *perchloride of phosphorus* being formed.

Chlorine is rapidly absorbed by cold water, but it may be collected over water of a degree of warmth in which the hand can be placed without inconvenience. It cannot be collected over mercury, because it unites with that metal, forming *protochloride of mercury.*

Solution of chlorine is readily made by passing the gas into cold water, until it ceases to be absorbed: water recently boiled takes up twice its volume of the gas, which it yields again by boiling. The solution has the smell, taste, and colour of the gas. An aqueous solution of chlorine is ordered by the Edinburgh College, under the name of *Aqua oxymuriatica.* It is employed as a tonic and antiseptic in the low stages of typhus, &c., in doses of ♏x. to fʒss. Chlorine is also employed for destroying noxious effluvia :—

Chloride of lime and *chloride of soda* may be employed for counteracting bad smells arising from sewers, and all kinds of matter undergoing putrefaction. They will be found extensively useful for fumigating the apartments of sick people, because the chlorine is liberated from them so gradually as to produce no inconvenience to the patient. These compounds, which may be purchased ready prepared, are made as follows :—*Chloride of lime, bleaching powder,* or *oxymuriate of lime,* is made by passing chlorine gas over thin layers of recently slaked lime, in very fine powder. Much heat being evolved on account of the rapid absorption of the gas, it is necessary to conduct the process slowly, or the vessel holding the lime may be placed in cold water. The surface of the lime should be repeatedly renewed by stirring. Another way is to pass chlorine gas through a mixture of lime and water, and then to dry the precipitate.

Chloride of soda, or *Labarraque's disinfecting soda liquid* may be obtained *pure* by passing chlorine gas into a cold and moderately dilute solution of pure soda, until the liquid becomes saturated. A solution of carbonate of soda may be employed instead of that of pure alkali, in which case great excess of chlorine must be used, so as to remove all the carbonic acid. The same compound may also be obtained after the manner proposed by M. Payen, which consists in decomposing chloride of lime with carbonate of soda.

Chlorine is not acted upon by heat and electricity, neither is it affected by light, in a perfectly dry state; but when the gas containing watery vapour, or the aqueous solution is exposed to the action of light, decomposition takes place: the chlorine combines with the hydrogen of the water, forming muriatic acid, and the oxygen of the water is set free. This change soon takes place in the direct rays of the sun, but less rapidly out of the sun's rays, and not at all in the dark; so that it is necessary to preserve solution of chlorine, or the moist gas,* in a dark situation.

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* It may be observed, *en passant*, that most gases, when first obtained, contain more or less of watery vapour, from which they may be freed by means of *chloride of calcium*, a substance that has great affinity for water.

Chlorine and *oxygen*.—These unite in four different proportions, forming compounds constituted as follows;—

	Chlorine.		Oxygen.	
Protoxide of chlorine	36	+	8	The oxygen being as 1, 4, 5 and 7.
Peroxide of chlorine......	36	+	32	
Chloric acid	36	+	40	
Perchloric acid...........	36	+	56	

Of these compounds it will only be necessary in this place to speak of *chloric acid*.—To obtain this acid, add to a diluted solution of chlorate of baryta as much very diluted sulphuric acid as will exactly remove the baryta: the sulphate of baryta precipitates, and the chloric acid set free is held in solution.

Chloric acid with alkaline bases forms a class of salts called *chlorates*, which were formerly known under the name of *hyperoxymuriates*.

Chlorine and *hydrogen* combine in only one proportion, forming *muriatic acid*, see page 83.

Sulphur.

The manner in which this elementary body is obtained is explained at page 69. Sulphur is a non-conductor of electricity, becomes negatively excited by friction, has scarcely any taste, and its odour only becomes sensible when rubbed. Its sp. gr. is 1.99, and its atomic weight 16. It fuses at 216° F., and has a disposition to crystallize in cooling: the middle of common roll sulphur is of a crystalline texture. Its volatility is such, that it begins to form into vapour before it is perfectly fused. At 600° F., and even much below that temperature, it volatilizes rapidly, and condenses unchanged on cooling in close vessels. Sulphur is insoluble in water, but it is soluble in boiling oil of turpentine, and also in alcohol, if both are brought in contact in the state of vapour.

Sulphur and *oxygen.*—There are four compounds of these, viz.

	Sulphur		Oxygen		Atomic weight
Hyposulphurous acid.....	32	+	8	=	40
Sulphurous acid...........	16	+	16	=	32
Sulphuric acid.............	16	+	24	=	40
Hyposulphuric acid.......	32	+	40	=	72

In the first and last of these, the base is doubled: the oxygen in the four is as 1, 2, 3, and 5. *Hyposulphurous acid* (which like the hyponitrous acid cannot exist except in combination with a base) and *hyposulphuric acid* may be passed over. *Sulphuric acid* is described at page 8; it therefore only remains to speak of *sulphurous acid:*—

Sulphurous acid is formed when sulphur is burned in oxygen gas or atmospheric air. It may also be procured by abstracting 1 atom of oxygen from sulphuric acid, which may be effected in a variety of ways, one of which it will be sufficient to describe at length. Put a little mercury into a glass retort with concentrated sulphuric acid and apply the heat of a spirit-lamp:—

$$\begin{array}{c}\text{2 atoms of}\\ \text{sulphuric}\\ \text{acid}\\ \text{decomposed} = 80\end{array} \left\{ \begin{array}{l} \text{Sulphurous acid } 32 \\ \qquad\qquad\quad\;\; 2 \\ \qquad\qquad\quad\;\; \overline{} \\ \qquad\qquad\quad\; 64 \\ \qquad\qquad\quad\;\; \overline{} \\ \underbrace{\text{Oxygen } 16 \;\; \text{Mercury } 200}_{\text{Peroxide of mercury } 216} \end{array} \right.$$

$$\underbrace{\begin{array}{c}\text{Peroxide of mercury } 216 \\ \text{2 atoms of sulph. acid undecomposed} = 80\end{array}}_{\text{Bipersulphate of mercury } 296.}$$

One atom of mercury decomposes 2 atoms of sulphuric acid = 80, abstracting 2 atoms of oxygen = 16, and forming 1 atom of peroxide of mercury = 216, which uniting with 2 atoms of undecomposed acid gives rise to 1 atom of bipersulphate of mercury = 296, which remains in the retort, and 2 atoms of sulphurous acid = 64 pass over in the state of gas. Most of the other metals act upon sulphuric acid in a similar way with the assistance of heat. Sulphurous acid being rapidly absorbed by water, can only be collected in the mercurial bath.

Sulphurous acid at the ordinary pressure and temperature is a colourless gas, and is known from all other gaseous bodies by its smell, which is exceedingly pungent and suffocating. It is highly destructive of life and combustion, and is not inflammable. It is possessed of powerful bleaching properties; but the colour which disappears through its action may be restored by adding an alkali, or a stronger acid. Its sp.

gr. is 2.2222. It is more readily brought into the liquid state by compression than any of the other gases. According to Mr. Faraday, the force of two atmospheres is sufficient to liquefy it; and according to M. Bussy, it may be obtained in a liquid and anhydrous state by transmitting it through tubes surrounded by a freezing mixture composed of snow and salt. In this state its sp. gr. is 1.45, and it is so extremely volatile as to boil at 14° F. Cold water that has been recently boiled absorbs about 33 times its volume of sulphurous acid gas at 60° F. and 30 inches barometrical pressure. The solution has the same smell as the gas. By boiling the solution the gas is given off unchanged. The salts which sulphurous acid forms with bases are called *sulphites.*

Sulphur and *hydrogen* form two compounds:—

	Hydrogen		Sulphur		Weight. of atom
Sulphuretted hydrogen.......	1	+	16	=	17
Bisulphuretted hydrogen.....	1	+	32	=	33

Sulphuretted hydrogen.—To obtain this compound put some of the black sulphuret of antimony into a glass retort with about five-times its weight of strong muriatic acid, and apply the heat of a spirit-lamp:—

Sulphuretted Hydrogen 17

Sulphuret of antimony 60	Sulphur..... 16	Hydrogen 1	Water 9
	Antimony.. 44	Oxygen.. 8	

Protoxide of antimony 52
Muriatic acid 37

Muriate of antimony 89.

The water of the muriatic acid and the sulphuret of antimony are mutually decomposed, oxygen uniting with antimony and sulphur with hydrogen, giving rise to *protoxide of antimony*, and *sulphuretted hydrogen*, the former of which unites with the muriatic acid forming *muriate of antimony*, while the latter escapes in the state of gas. Or it may be said that the muriatic acid and sulphuret of antimony are mutually decomposed; in which case *sulphuretted hydrogen* is generated by the hydrogen of the muriatic acid uniting with the sulphur, and *chloride of antimony* by the union of the chlorine with antimony. It is impossible to state which theory is the true one.

Sulphuretted hydrogen gas is rapidly absorbed by water, which takes up its own volume; it is colourless, and possesses a very disagreeable taste and odour, resembling those of rotten eggs. It is destructive of animal life in its pure state, and is extremely inimical to it, even when considerably diluted with atmospheric air. It is destructive of combustion, but is itself inflammable: as it burns, water and sulphurous acid are formed, and some sulphur is deposited. It forms an explosive mixture with oxygen, water and sulphurous acid being generated, by which means its composition may be inferred. Its sp. gr. is 1.1805. It reddens litmus paper, and unites with bases after the manner of an acid, and forms salts, which are called *hydro-sulphurets* or *hydro-sulphates:* it is in consequence sometimes called *hydro-sulphuric acid.*

An aqueous solution of this gas is made by passing it through water. The solution, which has the same taste and smell as the gas itself, is employed as a test, but it cannot be kept in glass bottles in which lead enters in composition, from its great affinity for that metal; it should, therefore, be preserved in bottles made of green glass. The solution soon decomposes by exposure to air, oxygen being attracted and sulphur deposited.

Bisulphuretted hydrogen.—This compound is formed by boiling equal parts of recently slaked lime and flowers of sulphur, in five or six parts of water, and then adding muriatic acid to the solution. The decomposition which takes place is similar to that described under *sulphur præcipitatum*, at page 170. Bisulphuretted hydrogen is a yellowish viscid semi-fluid, of an oily consistence. Its odour and taste are similar to those of sulphuretted hydrogen, though not in so strong a degree, and like that compound it possesses acid qualities. The salts which it forms with bases are called *sulphuretted hydrosulphurets.*

Carbon.

This elementary body exists in a state of purity in the *diamond,* and in an impure state in *charcoal.* Charcoal is obtained by heating wood out of contact of air, or by burning it with the slightest possible admission of air, so as to drive off the volatile parts, see *Pyroligneous Acid* and *Tar.* Charcoal less pure, called *coke,* is derived from the destructive distillation of coal, as in making coal-gas. *Animal charcoal,* or *ivory black,* is derived by a similar process from bones; and other varieties of charcoal are obtained by different modes of manipulation.

Charcoal is a very bad conductor of heat, but a good conductor of electricity. It is perfectly insoluble in water, and acids and alkalies scarcely affect it—nitric acid acts upon it with difficulty. It undergoes very little change by long exposure to air and moisture, and the most intense heat does not affect it, provided atmospheric air be excluded. Fresh burnt charcoal has the property of absorbing atmospheric air and other gases in considerable quantities, and of yielding them again unchanged when heated: all gases are not, however, equally absorbable by it. It has also the property of absorbing the odoriferous and colouring matters of animal and vegetable bodies, and is hence employed for restoring tainted meat, and for removing the colour from animal and vegetable infusions: for the latter purpose, animal charcoal is best; the coloured liquor should be digested with it in fine powder, and then filtered.*

The sp. gr. of the diamond, which is the hardest of all known substances, is 3.520; that of charcoal, according to Leslie, is somewhat greater. The atomic weight of carbon is 6.

Carbon and *oxygen* unite in 3 proportions forming—

	Carbon		Oxygen		Atomic weight.
Carbonic oxide	6	+	8	=	14
Carbonic acid............	6	+	16	=	22
Oxalic acid	12	+	24	=	36

Oxalic acid is described at page 182.

Carbonic acid was first discovered by Dr. Black in 1757, and was described by him under the name of *fixed air*. He obtained it from common limestone and other carbonates, by means of heat or acids, and found that it is formed by the different processes of combustion, respiration, and fermentation.

When charcoal or the diamond is burned in oxygen gas, carbonic acid is always formed, which proves the identity of these two substances, the physical difference between them merely arising from a difference of

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* Orfila and other chemists have recommended chlorine as a decolorizing agent, previous to applying tests to certain liquids; but it ought not to be employed, as it very frequently reacts upon the test.

aggregation in their particles. Carbonic acid is very readily obtained by acting upon white marble (carbonate of lime) with diluted muriatic acid; *muriate of lime* is thus formed, and carbonic acid expelled in the gaseous state. The other carbonates also afford it by the action of most acids, and it is expelled by heat from all of them, except those of soda, potash, and lithia.

Carbonic acid gas is colourless, and devoid of smell, and is destructive of life and combustion, even when considerably diluted with atmospheric air. It is not inflammable. It requires a pressure equal to that of as many as 36 atmospheres to condense it into a liquid form. Its sp. gr. is 1.5277, and according to Dr. Thomson 100 cubic inches at 60° F., and 30 inches barometrical pressure, weigh 46.597 grains. Water recently boiled absorbs its own volume of this gas under ordinary temperature and pressure, and by increase of pressure, it may be made to take up a much greater quantity; the quantity absorbed is in exact ratio with the force of compression, water absorbing twice its volume when the pressure is doubled, and three times its volume when the pressure is trebled. Different forms of apparatus are employed to supersaturate water with carbonic acid gas, and the solution thus obtained is sold in the shops under the name of *aërated water*,* and forms a pleasant effervescing draught when poured into a tumbler, in consequence

* It is frequently and erroneously called *soda water*.

of the greater portion of the carbonic acid escaping by the removal of the pressure.

Carbonic acid, as already explained, is at all times present in the atmosphere, it being copiously formed by combustion, respiration, and a variety of other processes continually going on in nature. It is equally diffused through the atmosphere, from the property which all gases possess, whatever be their density, of mixing uniformly with each other. It is, however, apt to accumulate in deep wells and other cavities in the earth in which it is generated, and is known to the miner under the name of *choke damp*. Its presence is usually determined by letting down a burning candle when it becomes necessary to descend into such places; but it should be remembered that a quantity of atmospheric air, sufficient to support combustion in such cases, may not be sufficient to support respiration. Numerous and fatal accidents have occurred from persons sleeping in confined rooms in which charcoal has been burning in portable stoves; and instances might also be adduced of the accumulation of carbonic acid in the vats of large brewing establishments proving fatal to workmen who have had occasion to descend into them. Carbonic acid in a pure state produces death by causing spasm of the glottis; but in a dilute state, as when slowly formed by the combustion of charcoal in confined apartments, it acts as a narcotic.

Carbonic acid is contained in spring and well-water, and several mineral springs are highly impregnated with it. To its presence also the sparkling and pungent quality of cider, champaign, beer, and other fermented liquors is owing. Boiled water is insipid, and fermented liquors become stale by exposure to the air in consequence of being deprived of it.

Notwithstanding carbonic acid is taken up by water, it may be collected over that fluid; but the vessels in which it is received should be removed in a closed state from the water-bath, otherwise it will be gradually absorbed.

Respiration.—There are two theories respecting the process of respiration, or the conversion of dark, venous blood into the florid arterial. One maintains that the carbonic acid, thrown out at each expiration, is generated in the lungs themselves by the carbon of the venous blood uniting with the oxygen of the inspired air;—the other, that carbonic acid exists ready formed in the venous blood, and that it is merely thrown off during the circulation of that liquid through the lungs, while oxygen is absorbed from the air. It is impossible to say which of these theories is to be preferred, and in this place there is not room to discuss the merits of either. There is given off from the lungs at each expiration, *carbonic acid*, *azote* of the decomposed air, *air undecomposed*, and *watery vapour*, the last of which in cold weather is seen to condense in a cloudy state as it issues from the mouth—its origin, like that of carbonic acid, is differently accounted for.

It has been shewn by experiments instituted by Jurine and Abernethy, that carbonic acid is given off from the surface of the body with absorption of oxygen gas, as at the lungs; and it has been proved by Spallanzani that some of the lower animals, such as frogs, lizards, and serpents, act precisely in the same way on the air by their skins as by the organs of respiration; and according to Dr. Edwards, it is owing to this circumstance that these animals are enabled to live for a great length of time under water.

It might be expected that something should be said in this place respecting the origin of animal heat; but as no satisfactory conclusions have been arrived at—one party ascribing it to chemical changes taking place within the body during the conversion of venous into arterial blood, and another to nervous influence—the reader is referred to other works.

Carbonic oxide.—There are different methods of procuring this as well as most other compounds: put a mixture of dried chalk and bright iron filings into a gun-barrel or iron retort, apply a red heat, and collect the gas which is liberated over water. The theory of the process is as follows: the heat drives off the carbonic acid from the chalk, and the iron abstracting 1 atom of oxygen from it at the moment of its liberation converts it into *carbonic oxide.* The carbonic oxide, however, does not come over pure, but is mixed with carbonic acid, from which it may be separated by washing it with lime-water.

Carbonic oxide gas is colourless, it possesses a disagreeable odour, is destructive of life and combustion, and is inflammable. During its combustion carbonic acid gas is generated. It is only sparingly absorbed by water. Its sp. gr. is .9721.

Carbon and *azote* form *cyanogen*,* or *bicarburet of azote*, which was discovered by Gay-Lussac in 1815. It is obtained by heating cyanuret of mercury in a small glass retort, or test tube, with the flame of a spirit-lamp, and must be collected over mercury. Cyanuret of mercury is composed of 2 atoms cyanogen, and 1 atom mercury; the heat expels the cyanogen in the state of gas, and the mercury is reduced to the metallic state. During the process, part of the cyanogen becomes decomposed by the heat employed to separate it from the mercury, a little charcoal is in consequence found in the tube, and some azote is set free.

Cyanogen is a colourless gas, and possesses a pungent and peculiar odour. It is destructive of life and combustion, but is combustible, burning with a very beautiful purple-coloured flame. It is capable of being condensed into the liquid state by a pressure of 3.6 atmospheres at 45° F. Water at 60° F. absorbs 4.5 times its volume. It is composed of 1 atom azote, and 2 atoms carbon, and its sp. gr. is 1.8054. It combines with some bodies forming acids; and with others, *cyanides*, or *cyanurets*, a class of compounds devoid of acid properties. It possesses no acid properties itself.

The only compounds formed by cyanogen with other bodies, which deserve notice in a work of this kind,

* From κύανος, *blue*, and γεννάω, *I generate*.

are *hydrocyanic acid*, described at page 178, *cyanuret of mercury*,* and *ferrocyanic acid*.

Ferrocyanic acid.—The following methods of obtaining this acid are proposed by Mr. Porrett; by the first, it is procured in crystals; by the second, in solution:—Let 58 grains of crystallized tartaric acid be dissolved in alcohol; to the solution add 50 grains of ferrocyanate of potash, dissolved in the smallest possible quantity of hot water. Bitartrate of potash will be precipitated, and by allowing the clear solution to

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* To form *cyanuret of mercury*, boil eight parts of Prussian blue (ferrocyanate of the peroxide of iron) powdered and dried, with eleven parts of peroxide of mercury, in a sufficient quantity of water, until the blue colour of the former is quite destroyed. Filter, and then concentrate the solution by evaporation, and set it aside: as it cools, crystals of cyanuret of mercury will be deposited. During the process, the oxygen of the peroxide of mercury unites with the iron and hydrogen of the ferrocyanic acid, forming water and peroxide of iron, and the mercury unites with the cyanogen of the ferrocyanic acid, forming cyanuret of mercury. It is necessary to digest the Prussian blue of commerce in dilute muriatic acid, to free it from the impurities which it contains, after which it should be washed on a filter.—The crystals of cyanuret of mercury are quadrangular prisms: they are without smell, but have a very nauseous metallic taste, and are exceedingly poisonous. They are composed of 1 atom mercury, and 2 atoms cyanogen.

evaporate spontaneously, small cubic yellow-coloured crystals of ferrocyanic acid will be gradually deposited. —The second method consists in dissolving ferrocyanate of baryta in water, and then adding as much sulphuric acid as will be exactly sufficient to remove the baryta: the sulphate of baryta precipitates, and the ferrocyanic acid remains in solution. Ferrocyanic acid is composed of 2 atoms hydrogen, 1 atom iron, and 3 atoms cyanogen; or of 2 atoms hydrocyanic acid, and 1 atom cyanuret of iron.

This acid unites with bases forming salts called *ferrocyanates,* which were formerly known under the name of *triple prussiates,* from the supposition that they consisted of *prussic,* or *hydrocyanic acid,* in combination with oxide of iron and some other base. Prussian blue is a ferrocyanate of the peroxide of iron, and it is always produced when ferrocyanic acid or a ferrocyanate is added to a per-salt of iron, see pages 425 and 441. Ferrocyanic acid is without smell, and is not volatile. It gradually decomposes by exposure to light. It is not poisonous.

Carbon and *hydrogen.*—These form two compounds, *light carburetted hydrogen,* and *olefiant gas,* which have been known for some years. Mr. Faraday has discovered other compounds of these bodies, and according to Dr. Thomson, *naptha* and *naphthaline* are carburets of hydrogen. Naphtha is described at page 49 as a natural production: it is obtained artificially by the distillation of coal-tar. Napthaline, which is also afforded by the distillation of coal-tar, is a white crystalline solid.

Light carburetted hydrogen.—This compound, which is also known under the following names—*heavy inflammable air, inflammable air of marshes, hydrocarburet of hydrogen, protocarburet of hydrogen,* and *bi-hydroguret of carbon,* is the gas which is generated in stagnant waters by the spontaneous decomposition of dead vegetable bodies, and it may be obtained by stirring up the mud. As the gas rises it is to be received in wide mouthed bottles filled with water, and inverted in the usual way. It is then to be washed with solution of pure potash or lime-water, to free it from the carbonic acid which it always contains.

This gas, which is colourless, is without taste, and has scarcely any smell, and is destructive of life and combustion. It is inflammable, and with oxygen gas or atmospheric air, it forms a mixture which explodes by means of flame, or the electric spark, with the production of water and carbonic acid. It is light carburetted hydrogen which constitutes the *fire-damp* of coal-mines. Whenever it collects in any quantity in these places, it forms, with the atmospheric air, a mixture, which explodes on the contact of flame, producing the most dreadful effects, hurling men, horses, and machinery, in all directions, even projecting them out of the shaft of the mine, if that be situated within the sphere of its influence. Accidents of this kind are, however, much less frequent since the invention of the *safety lamp* by Sir H. Davy. In this lamp the flame is surrounded with a cage of fine wire gauze, the open spaces in which are not permeable to flame. When the lamp is brought into an atmosphere charged with fire-damp, its flame is seen to enlarge; and if the mixture formed be exceedingly explosive it will take fire within the cage, while the flame of the lamp will be extinguished. The miner becoming sensible of his danger must now retire, for although the burning mixture within the cage cannot communicate through the wire gauze with the explosive mixture on the outside, yet in consequence of the intensity of the heat which is generated, the wire would soon become oxidized and fall to pieces, and then explosion must ensue.

Light carburetted hydrogen is composed of 1 atom carbon, and 2 atoms hydrogen. Its sp. gr. is 0.5554.

Olefiant gas,* also called *bicarburetted*, or *percarburetted hydrogen* and *hydroguret of carbon*, was discovered by the associated Dutch chemists in 1796. It may be obtained by heating a mixture of 6 measures of alcohol with 16 of strong sulphuric acid in a large retort, by means of a spirit-lamp, and may be received either over water or mercury. The changes which take place during the process are numerous and intricate. The olefiant gas is derived entirely from the alcohol: alcohol is composed of 2 atoms carbon, 1 atom

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* This name was given to it by its discoverers from its forming an oily-looking liquid with chlorine.

oxygen, and 3 atoms hydrogen; or of 14 parts or 1 atom of olefiant gas, and 9 parts or 1 atom of water. The sulphuric acid therefore abstracting 1 atom of water from 1 atom of alcohol, 1 atom of olefiant gas is set at liberty. During the process æther, sulphurous acid, and carbonic acid are formed, and pass over along with the olefiant gas, and charcoal along with *ethereal oil*, or *oil of wine*, remains in the retort. See *Æther sulph.* page 293. Olefiant gas is separated from the sulphurous and carbonic acid, which it at first contains, by washing it with either a solution of potash or lime-water.

Olefiant gas is colourless, it has no taste, and scarcely any odour when quite pure, is destructive of life and combustion, and is inflammable. It forms a mixture with oxygen, which explodes by means of flame, or the electric spark. Its sp. gr. is .9722; and it is composed of 2 atoms carbon, and 2 atoms hydrogen.

Phosphorus.

This elementary body was discovered about 1669 by Brandt, a German alchemist, while searching for the philosopher's stone. It was first obtained by evaporating putrid urine to dryness, and then distilling the residue in an earthen-ware retort with charcoal. The mode of obtaining it was for a long time kept secret. Scheele afterwards proposed a method of obtaining it from bones: the bones are first deprived of their animal matter by burning them in an open fire till they become quite white; the phosphate of lime remaining, is then reduced to fine powder and digested for a day or two with concentrated sulphuric acid, water being added so as to give the mixture a thin pasty consistence. By the action of the sulphuric acid, sulphate of lime and superphosphate of lime are formed. By adding boiling water to these, the latter is dissolved, and then separated from the former by filtration. The solution of phosphate of lime, after being evaporated to the consistence of syrup, is mixed with a fourth of its weight of charcoal powder, and the mixture is heated in an earthen-ware retort, the beak of which is made to dip in cold water, in which the phosphorus, as it distils over in the form of vapour, is received and condensed. During the distillatory part of the process, the charcoal separates the oxygen from the phosphoric acid of the phosphate of lime, leaving the phosphorus in a free state. To obtain the phosphorus quite pure, it will be either necessary to submit it to a second distillation, or to put it in hot water and press it, while liquid, through chamois leather.

Phosphorus, when quite pure, is a white transparent substance. When cut with a knife, the fresh surface has a waxy appearance. It is remarkably inflammable, taking fire by means of the heat generated by only a moderate degree of friction. If it be exposed to the air at common temperatures, it undergoes what is called *slow* combustion, is luminous in the dark, and the white vapour which appears from its union with oxygen is characterized by a garlic odour. It fuses at 108° F. and at 550° it rises in vapour. It is soluble with the assistance of heat in naphtha, in fixed and volatile oils, and in some other fluids. The atomic weight of phosphorus, according to Dr. Thomson, is 12, and according to Berzelius 15.71.

Phosphorus and *oxygen.*—These combine in different proportions, forming four acid compounds, of which it will be sufficient to notice the *phosphoric acid.* Phosphoric acid is formed synthetically when phosphorus is burnt in dry oxygen gas or atmospheric air. The white vapour which is at first formed, soon aggregates in distinct particles, and falls to the bottom of the vessel like flakes of snow. In this state it is an anhydrous bulky solid, possessed of a slight degree of tenacity. When exposed to the air, it soon becomes liquid in consequence of attracting moisture. Phosphoric acid may be obtained by acting upon phosphorus with nitric acid; and it may also be procured from bones. Phosphoric acid combines in all proportions with water. It possesses all the properties of an acid in a very powerful degree. The salts which it forms with bases are called *phosphates.* Phosphate of lime enters largely into the composition of bones, and phosphate of soda is employed as a saline aperient by the Edinburgh College in doses of ℥ss. to ℥j. dissolved in water.

Phosphoric acid, according to Dr. Thomson, is composed of 1 atom phosphorus = 12 and 2 atoms oxygen = 16.

According to the analyses of Berzelius, the atomic weight of phosphorus is 15.71, and phosphoric acid is composed of 1 atom phosphorus and 2½ atoms oxygen.

Boron.

Boron was discovered by Sir H. Davy in 1807. He obtained it by acting on boracic acid with a powerful galvanic battery, but only in a sufficient quantity to prove its existence. Gay-Lussac and Thénard in the following year procured it more abundantly by decomposing boracic acid with potassium by means of heat; the potassium abstracts the oxygen from the boracic acid, leaving the boron in a free state.

Boron is a dark olive-coloured substance, possessing neither taste nor smell, and is a non-conductor of electricity. It is insoluble in water, alcohol, æther, and oils, and is not changed by exposure to the air at ordinary temperatures, but if heated to 600° F. it takes fire, and is converted into boracic acid by combining with oxygen. Its atomic weight is 8, and its sp. gr. 2.

Boron and *Oxygen.*—These only unite in one proportion, forming *boracic acid.* This acid is found as a natural production in the hot springs of Lipari, and in those of Sasso, in the Florentine territory. It enters into the composition of several minerals, but is more commonly met with in combination with soda, with which base it constitutes *borax,* a salt described at page 65. Boracic acid is prepared artificially, by decomposing a boiling solution of borax with sulphuric acid: the sulphuric acid unites with the soda, and the boracic acid thus set free, is deposited in crystals as the solution cools; but it requires to be washed on a filter, with cold water, to separate it from sulphate of soda and sulphuric acid, after which, it should be again dissolved in hot water, and crystallized.

The crystals of boracic acid contain two atoms of water. They are more soluble in hot than cold water, and are readily soluble in boiling alcohol. When the alcoholic solution is set on fire, it burns with a beautiful and characteristic green flame. Boracic acid has only a slight action on litmus paper. It turns turmeric paper brown, like alkalies, which was first observed by Mr. Faraday. It is composed, according to Dr. Thomson, of 1 atom boron and 2 atoms oxygen.

Iodine.

This elementary body was discovered in 1812, by M. Courtois, a salt-petre manufacturer at Paris. He observed that the liquor left in preparing carbonate of soda from barilla, had the property of corroding metallic vessels; and in searching for the cause of this, he found that sulphuric acid precipitated a dark-coloured substance, which, on the application of heat was converted into a beautiful violet-coloured vapour. He communicated his observations to M. Clement, who found the substance in question to be a new body, the nature of which was afterwards more fully investigated by Gay-Lussac and Sir H. Davy.

Iodine is usually met with in opaque crystalline scales, which are soft and friable, of a bluish-black colour, and metallic lustre; but it may be obtained in large rhomboidal crystalline plates. It has a very acrid taste, and its smell somewhat resembles that of chlorine. It is a non-conductor of electricity. Its specific gravity is differently stated; according to Dr. Thomson, it is 3.0844. It fuses at 225° F., and sublimes at 347°; but if moisture be present, it sublimes at a lower temperature than that of boiling water, and it gradually volatilizes at ordinary temperatures. Its vapour, which is of a beautiful violet colour,* is so exceedingly dense, that 100 cubic inches, at 60° F., and 30 inches barometrical pressure, are calculated to weigh 262.612 grains, and its sp. gr. is 8.6102. Its atomic weight, according to Dr. Thomson, is 124. It requires 7000 times its weight of water for solution, but it is readily dissolved by alcohol and æther. The compounds formed by the union of iodine with other bodies, when not possessing acid properties, are called *iodides* or *iodurets*.

Iodine is a powerful irritant poison, but in proper doses it is found a very useful remedy in bronchocele and scrofulous diseases. The best form of administering it, is that of tincture. The tincture sold at Apothecaries' Hall, is made by dissolving 48 grains of iodine in 1 ounce of alcohol or rectified spirit. Of this, five or six minims may be given three times a-day, in water, for, although iodine is of very sparing solubility in water, that liquid does not precipitate it

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* The term *Iodine* is derived from Ἰώδης, *violet-coloured.*

from its solution in alcohol. Iodine is said to produce absorption of the mammæ in the female, and the testicles in the male, when its use has been long persevered in. The virtues of the *fucus vesiculosus* and *burnt sponge*, are to be attributed to the iodine which they contain. Iodine is also employed, locally, to reduce scrofulous glandular enlargements.

Starch is the best test for iodine, see page 440. Of the compounds formed by the union of iodine with the other elementary bodies, it is only necessary to notice the following:—

Iodine and *Hydrogen, Hydriodic acid.*—By passing the vapour of iodine mixed with hydrogen through a red-hot porcelain tube, these bodies combine in equal volumes, and form *hydriodic acid gas.* This gas, which may also be obtained by other methods, is colourless, and has a sour taste, its smell resembles that of muriatic acid gas, it produces dense white vapours in mixing with atmospheric air, in consequence of attracting water, and it turns vegetable blues red. By weight this acid consists of 1 atom iodine, and 1 atom hydrogen, and its atomic weight is 1·25. Its sp. gr. is 4.3398. It unites with alkaline bases, forming a class of salts called *hydriodates,* one of which, *hydriodate of potash,* is used medicinally and is hereafter described. By passing the gas into water it becomes absorbed, and the solution which is colourless, gives off white fumes when exposed to the air. A solution of hydriodic acid may be procured by passing a current of sulphuretted hydrogen gas through water containing iodine in mechanical suspension: the iodine abstracts the hydrogen from the sulphuretted hydrogen, forming hydriodic acid, and sulphur is set free. When all the iodine is converted into hydriodic acid, the solution must be gently heated to drive off any excess of sulphuretted hydrogen, and then filtered, to remove the free sulphur which it contains. The sp. gr. of the saturated solution is about 1.7. The solution soon undergoes decomposition when exposed to the air, the hydrogen of the acid attracting oxygen, and iodine being set free. It is also decomposed by sulphuric and nitric acids, and chlorine, as explained at page 424. From the absorption of the gas by water, it is necessary to collect it over mercury.

Hydriodic acid is found as a natural production in combination with soda or potash, and is met with in this state in mineral springs, sea water, sea-weeds, sponges, and marine molluscous animals. Iodine is procured from kelp or barilla.* Kelp or barilla is employed for obtaining carbonate of soda, and after that salt has crystallized from the aqueous solution, a dark liquor remains, which contains a large portion of hydriodic acid in combination with soda. On adding to this liquor, sulphuric acid, the hydriodic acid is separated from the soda, and at the same time decomposed, iodine being set free, as explained at page 424, and on boiling the solution the iodine sublimes, and its

* See *Soda impura*, page 66.

vapour is condensed by being passed into cool glass receivers.

Hydriodate of potash.—This salt may be made by neutralizing solution of hydriodic acid with pure potash; but instead of having previously to make the acid solution, Dr. Turner recommends the following mode of proceeding which may be resorted to when the salt is required for medical use:—"Add to a hot solution of pure potash as much iodine as it is capable of dissolving, by which means a deep brownish-red coloured fluid is formed, consisting of iodate and hydriodate of potash,* together with a large excess of free iodine. Through this solution a current of sulphuretted hydrogen gas is to be transmitted, until the free iodine and iodic acid are converted into hydriodic acid, changes which may be known to be accomplished by the liquid becoming quite limpid and colourless. The solution is then to be gently heated in order to expel any excess of sulphuretted hydrogen, and after being filtered, any free hydriodic acid is to be exactly neutralized by pure potash."

In crystallizing hydriodate of potash from its solution, it is converted into iodide of potassium, the hydrogen of the hydriodic acid uniting with the oxygen of the potash, and the iodine with the potassium.

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* The iodic acid of the *iodate* is formed by the union of iodine with the oxygen of the water; the *hydriodic* acid of the *hydriodate*, by the union of iodine with the hydrogen of the water.

The crystallized salt, therefore, in the shops, known under the name of *hydriodate of potash*, is iodide of potassium. This compound is very soluble in water and alcohol.

Hydriodate of potash (*iodide of potassium*) is employed medicinally in the same cases as iodine, (See Iodine) and is considered an excellent form of exhibiting that remedy. The dose is gr. $\frac{1}{3}$, three times a-day. It may also be used locally in form of ointment.

Selenium.

Selenium was discovered by Berzelius in 1818. He obtained it from the sulphur procured by sublimation from the iron pyrites of Fahlun in Sweden, and it has since been furnished by other sources. Selenium is a solid body, and has a metallic lustre, and the aspect of lead, in mass; but it becomes of a deep red colour when reduced to powder. It is brittle, has neither taste nor smell, is insoluble in water, and is not altered by exposure to the air, unless it be heated. Its sp. gr. is about 4.3. The compounds formed by the union of selenium with other bodies, it is not necessary to notice.

Bromine.

Bromine was discovered in 1825, by M. Balard, of Montpellier. It was first obtained from sea-water, in which it exists in the state of hydrobromic acid combined, according to M. Balard, with magnesia, and it is also found to exist in several mineral springs, in marine plants, and in the ashes of some animals.

Bromine at common temperatures is liquid. Its colour is blackish-red, if viewed in any quantity by reflected light, but hyacinthine-red if spread thinly on glass and viewed by transmitted light. Its odour bears some resemblance to that of chlorine, and its taste is strong and unpleasant. It is exceedingly volatile, even in common temperatures, giving off red-coloured vapours, and at about 116° F. it boils. At a temperature a little below zero, it becomes a brittle solid. It is not acted upon by heat, light, or electricity, and is a non-conductor of electricity.

Bromine unites with several bodies forming a variety of compounds.

Fluorine.

Fluorine is the base of *hydro-fluoric acid*, an acid which has the property of corroding glass; and it is one of the ingredients of *fluor-spar*, a mineral composed of calcium and fluorine. Fluorine has not as yet been obtained in a state of separation.

*Metals.**

The metals are characterized by possessing a peculiar lustre, termed the *metallic lustre*. They are conductors of caloric and electricity, and most of them are good reflectors of light. They are called positive electrics from always appearing at the negative side of the battery when certain of their compounds

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* A list of the metals is given at page xx.

are submitted to the action of galvanism. Most of them are possessed of great specific gravity: platinum, which is the heaviest of all known bodies, is very nearly 21 times heavier than its bulk of water, and gold is more than 19 times heavier than that fluid; potassium and sodium, on the other hand, are so light as to swim upon water. Some metals are capable of being hammered into thin leaves or plates; others are less malleable; and some are so brittle as to be readily pulverized in a mortar—*arsenic*, *antimony*, and *bismuth* are of this class.

With oxygen, the metals form *oxides*, and sometimes *acids;* with chlorine, *chlorides* or *chlorurets*; with iodine, *iodides* or *iodurets*; with sulphur, *sulphurets*; with phosphorus, *phosphurets*. Carbon unites with some metals, forming *carburets:* thus, *cast iron*, *steel*, and *plumbago* or *black lead*, are carburets of iron. Hydrogen only unites with zinc, potassium, tellurium, and arsenic, forming *hydrogurets*. Azote unites with none of the metals. Cyanogen with metals forms *cyanides* or *cyanurets*. The metals unite with each other in all proportions, forming *alloys;* when mercury is an ingredient, the compound is called an *amalgam*.

The metals *potassium*, *sodium*, and *lithium*, are the bases of the fixed alkalies.

Barium, *strontium*, *calcium*, and *magnesium*, are the bases of the alkaline earths. See page 113.

Aluminium, *zirconium*, *glucinium*, *silicium*, *yttrium*, and *thorinum*, are the bases of the pure earths.

The remaining 28 metals either form ordinary oxides or acids with oxygen. The metals capable of forming acids are *manganese*, *molybdenum*, *arsenic*, *chromium*, *antimony*, *tungsten*, *columbium*, *tellurium*, *titanium*, and *gold*.

Some of the metals, the compounds of which are employed medicinally, being described in other parts of this work, it will only be necessary to notice the following in this place;—

Potassium.

Potassium was discovered by Sir H. Davy in 1807. He obtained it by acting upon hydrate of potash* with a powerful galvanic battery. By this method the metal can only be obtained in a very small quantity; but other means have since been devised by which potash may be more readily deprived of oxygen. One of these, which was first adopted by Gay-Lussac and Thénard, consists in exposing the fused hydrate of potash to iron turnings, heated to whiteness in a gun-barrel: the iron abstracts the oxygen from the water and potash, and the potassium sublimes, and afterwards condenses in the cool part of the apparatus, while the hydrogen of the water in combination with a little of the potassium, is liberated in the gaseous state. There are other and more eligible modes of obtaining the metallic base of the alkali, which are described in chemical works.

Potassium in colour and lustre, resembles mercury;

* The *potassa fusa* of the Pharmacopœia.

it is solid at the ordinary temperature of the atmosphere, and becomes fluid at about 150° F., but it evinces a disposition to fluidity, at even 70° F.; at 32° it is brittle, but at 50° it is soft and cuts like wax. It may be distilled at a red heat, in close vessels, and condenses unchanged as it cools. Its sp. gr. is only 0.865; its affinity for oxygen is so great, that it can only be kept in naphtha, a fluid devoid of oxygen, or in tubes hermetically sealed. When thrown upon water, it decomposes it, attracts oxygen, and the heat evolved, inflames the potassium; the hydrogen of the water being set free, combines with a little of the metal, forming potassiuretted hydrogen, which also takes fire as it is given off, and communicates the peculiar colour to the whole flame. After the combustion, the water has an alkaline reaction with tumeric paper, in consequence of *potash* being formed. If potassium be plunged under water, very violent action takes place, pure hydrogen is liberated, but there is no appearance of flame. When potassium is exposed to dry air or oxygen gas, it is then converted into anhydrous potash; and when set on fire, in the air or oxygen gas, it forms an orange-coloured compound, which is the peroxide of the metal. *Potash*, or *protoxide of potassium*, contains 1 atom potassium, and 1 atom oxygen; *peroxide of potassium*, 1 atom potassium, and 3 atoms oxygen.

Sodium.

This metal, which is the base of soda, was obtained by Sir H. Davy, by means of galvanism, a few days after he had made the discovery of potassium. It may be obtained from hydrate of soda, by processes similar to those described for obtaining potassium.

Sodium resembles silver in lustre and colour. At common temperatures, it may be readily pressed into thin leaves with the fingers. It fuses at 200° F., and sublimes at a red heat. It is nearly as heavy as water, its sp. gr. being 0.972. When thrown upon water, it swims and decomposes that fluid, soda is formed, and pure hydrogen liberated, but without the appearance of flame; with hot water, a few sparks are seen, but no flame. It does not oxidize so rapidly as potassium, when exposed to the air. Like potassium, it forms two oxides—*soda*, and the *peroxide of sodium*, an orange-coloured substance, which is formed by burning it in pure oxygen.

The galvanic researches of Sir H. Davy, have also demonstrated the existence of the metallic bases of the alkali, *lithia*, and the earths, *baryta*, *strontia*, *lime*, and *magnesia*; and those of the other earths have also been obtained by different processes, by Sir H. Davy and other chemists.

Salts.

Salts are a class of bodies, which consist of an acid in combination with a metallic oxide: the salts of ammonia are, however, an exception. The quantity of atoms of acid in a salt, are distinguished by prefixing the Latin numerals, when the acid combines in more proportions than one, with the base, as in the combinations of potash and oxalic acid, page 183; but when the base of the salt predominates the number of its atoms are expressed by the use of the Greek numerals, as explained in the foot note at page 163. The crystallization of salts, as well as that of other bodies has already been alluded to.

OF THE IMPONDERABLE BODIES.

Heat, *light*, *electricity*, and *magnetism*, are called *imponderable bodies*, from the belief that their physical effects are, in each case, owing to the presence of a fluid; but the actual existence of such fluids has not yet been proved. Admitting them to be fluids, as much lighter, for instance, than hydrogen, as hydrogen is lighter than platinum, it is evident that all human attempts to practically demonstrate their ponderability must for ever be abortive; hence, we can only judge of these principles, whatsoever they be, by their effects.

Caloric.

Caloric is the term employed to designate that which causes the sensation of *heat*. The particles of this principle repel each other, which is shewn by its being given off from heated bodies. It pervades all substances in nature, and exists in a *free* or *sensible* state, and in a *combined*, *latent*, or *insensible* state. Free caloric is that which flies off from heated bodies; latent caloric, that which exists in all bodies and which is not appreciable by the touch—thus, a piece of iron feels cold; but if it be smartly hammered on an anvil, its particles will be brought into closer approximation, and its affinity for caloric being thus diminished, the latent caloric which it contained then becomes sensible. The liberation of latent caloric, by adding water and sulphuric acid together, is explained at page 88.

Caloric is opposed to cohesive attraction; for while the latter unites the particles of bodies, the former effects their separation. When a body is heated, it therefore becomes expanded, that is, it occupies more space from its particles being thrown further apart; but on cooling it returns precisely to its original dimensions. Those bodies expand most on being heated in which the cohesive attraction is least, and those the least in which the cohesive attraction is greatest: thus, cohesion is the greatest in solids, less in liquids, and least in aëriform bodies; and, we accordingly find that expansion is least in solids, greater in liquids, and greatest in gases or vapours. Matter exists in three states—the *solid*, *liquid* or *fluid*, and *gaseous* or *aëriform* state.* These states are owing to the presence or absence of caloric; for instance, if we abstract

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* Gases and vapours are sometimes called *elastic fluids*. *Gases* are bodies which preserve their aëriform state at the ordinary temperature of the atmosphere; *vapours*, on the contrary, assume the liquid state at the same temperature.

caloric from water, it becomes ice; if we add caloric to it, it is converted into vapour; and we have every reason to believe, that all solids might be raised into the state of liquids or vapours, provided we could communicate to them a requisite degree of heat.

The *thermometer*, an instrument employed for measuring the temperature of bodies to a certain extent, is constructed in the following way:—a glass-tube, open at one end and blown into a bulb at the other, is partly filled with mercury, by heating the bulbous extremity with a spirit-lamp, so as to expel or rarify the air, and then dipping the other end into a vessel containing mercury, which fluid rises in the vacuum within the tube formed by the expulsion of air. The tube is now to be hermetically sealed, which is done by heating the mercury in the bulb until it expands so as to rise very nearly to the top of the tube, when the flame of a blow-pipe is thrown upon the open end, so as to fuse the glass and close the opening, by which means the atmospheric air is excluded. It now remains to form a scale by which the observations made with one thermometer may be compared with those made by another. To accomplish this, two fixed points are to be first obtained—the *freezing* and *boiling* points of water; the former is found by plunging the thermometer into melting snow or ice, which occasions the mercury to sink in the tube; and when it has become stationary, a mark is to be made on the glass with a diamond to denote the *freezing point* of water: the tube is next placed in a vessel containing water in the act of boiling; the mercury now rises in the tube, and when it again becomes stationary, another mark is made with the diamond which denotes the *boiling point* of water. Some caution is necessary in fixing the latter point: the water, distilled and free from foreign bodies, and not above an inch in depth, should be retained in a deep, bright, metallic vessel, so as to cause the stem and bulb of the thermometer to be submitted to an equal degree of temperature; while, at the same time, the steam should be allowed to escape with freedom, and the barometer should stand at 30 inches. Four thermometers are in use in Europe—*Fahrenheit's*, *Reaumur's*, the *Centigrade*, and *De Lisle's*; and in all of them the freezing and boiling points of water are obtained as above; but they differ from each other in the number of degrees into which the space between these points is divided: in Fahrenheit's thermometer there are 180° between the freezing and boiling points, the former being marked 32°, the latter 212°; in the centigrade, there are 100° between these points, the freezing point is marked 0, the boiling point, 100°; in Reaumur's, there are 80° between the same points, the freezing point is marked 0, the boiling point 80°; in De Lisle's scale there are 150° between the two points, the boiling point is marked 0, and the freezing point 150°. Fahrenheit's is the scale we employ in this country; but it is easy to reduce the degrees of one scale to those of another, by such rules as it is not necessary to recapitulate in this place. The graduations on the scales may be continued both above and below the two points for any number of required degrees. It is to be observed that as mercury can support a greater degree of heat without boiling than any other liquid, it is accordingly employed for denoting the higher temperatures; but as mercury freezes at 39° below zero of Fahrenheit's scale, it does not serve to indicate any lower temperature. Thermometers, therefore, intended to denote the lowest temperatures are filled with alcohol, a liquid that can bear the lowest known temperatures without freezing. When the thermometer is applied to a body hotter than itself, it abstracts caloric from that body, and the mercury rises in the tube; when it is applied to a body colder than itself, then it yields caloric to such body, and the mercury falls in the tube. *Pyrometers* are instruments for denoting very high temperatures which are beyond the range of the thermometer.

Now, as a body expands according to the quantity of caloric which is added to it, so it contracts in proportion to the quantity abstracted from it; but to this rule there is one remarkable exception, and that is in water. When hot water is cooled, we find that it contracts until it arrives at the temperature of about 40° F.; but if the cooling process be continued below that temperature, it then expands in the same proportion as when heated above it: thus, if we cool it to 32° F., which is 8 degrees lower than its maximum of density, 40°, it expands and occupies the same space as when heated to 48°, or 8 degrees above 40; and as expansion causes bodies to become specifically lighter, it hence follows, that ice swims on the surface of water. The cause of this remarkable property of water has not been altogether satisfactorily explained. If water in cooling continued to contract, like the generality of bodies, our rivers and lakes in winter would present one mass of ice, and the destruction of fish would be inevitable; but according to the law which it at present observes, the water below the surface of ice retains a temperature congenial to the life of those animals by which it is inhabited. Some of the metals in cooling from a state of fusion have also, like water, the property of becoming expanded.

When a body passes from a solid to a liquid state sensible heat is absorbed, it becomes latent, and the sensation of cold is produced; the conversion of a solid or liquid into the aëriform state is also attended with loss of sensible caloric. But when an aëriform body becomes liquid, or a liquid passes into the solid state, then latent heat is given out and becomes sensible.

All bodies are constantly attaining an equilibrium of temperature, heat being given off from bodies of a higher to those of a lower degree of temperature, either by *communication* or by *radiation*. Caloric is conducted by different bodies with different degrees of velocity. The metals are the best conductors of caloric, but some of these are better conductors than others. A person unacquainted with the different conducting power of bodies is apt to suppose, on handling different articles in an apartment, that some are colder than others; but this is not the case, provided there be no fire or other source of caloric present; for if we apply a thermometer to the fire-irons, marble chimney-piece, table, and window curtains, it will indicate the same temperature in each: a body, therefore, only feels cold in proportion to the rapidity with which it is able to conduct caloric. Articles of clothing, especially wool and furs, convey the sensation of warmth from the very imperfect manner in which they conduct caloric. Air is a very bad conductor of caloric. The same may be observed of liquids: water for instance, cannot be made to boil by applying heat to its surface. Liquids, notwithstanding, have the power of conducting heat with great rapidity in consequence of the facility with which their particles move upon each other: thus, if we apply heat to the bottom of a vessel of water, the lower part becomes rarified and ascends, while a colder stratum of that fluid descends to supply its place, which in turn becoming rarified again ascends, and so a rising and descending current of water become established, until the water is brought to its boiling point. Every fluid boils at one invariable point, under the same atmospheric pressure, but all fluids do not boil at the same point: thus, sulphuric æther boils at 96° F., alcohol at 173°, water at 212°, and mercury at 680°. But a fluid may be made to boil at a lower temperature by taking off the atmospheric pressure, and at a higher temperature by increasing the pressure at its surface.

Caloric is given off from a heated body equally in every direction, like radii drawn from the centre of a circle to its circumference. The rays pass freely through a vacuum, and the air; and they do not affect the temperature of the latter. If they fall upon the surface of a solid or liquid, they are either reflected in a new direction or are absorbed. When they are reflected from any substance, the temperature of that substance remains unchanged; but when they are absorbed, the temperature of bodies is increased. If radiant caloric be allowed to fall on a plate of polished metal, such as tin, silver, or brass, it will be immediately reflected in an opposite direction, where the heat will be perceived: the angle of reflection is always equal to the angle of incidence.

Mr. Leslie has observed that some substances give off or radiate caloric with much more rapidity than others, and that the nature of the surface of a heated body materially influences its radiation. Bright polished metallic surfaces radiate caloric very imperfectly, but they may be made good radiators by either scratching their surface, or covering it with whiting, lamp-black, or any thing that will hide or destroy the polish. It is on this account that water remains hot much longer in a pot of bright metal, than in one, the outer surface of which is devoid of polish.

Light, *electricity*, and *magnetism* cannot conveniently be treated upon in a volume of this kind.

W. M.

PHARMACOPŒIA

LONDINENSIS.

THE PHARMACOPŒIA OF LONDON.

PONDERA, MENSURÆ, &c.

WEIGHTS, MEASURES, &c.

Cum duo genera ponderum recepta sint usu
As two kinds of weights have been received in use

in Anglia, altero quorum aurum et argentum,
in England, by one of which gold and silver,

altero ferè cæteræ merces æstimantur,
by the other almost all other commodities are estimated,

nos utimur priore, quod et vocatur,
we use the former, which also is called,

Troy Weight: que dispertimus libram sic,
and we divide the pound thus,

videlicet:
namely:

Libra ℔ *The pound*	habet *contains*	Uncias duodecim ℥ *Twelve ounces.*
Uncia *The ounce*		Drachmas octo ʒ *Eight drams.*
Drachma *The dram*		Scrupulos tres ℈ *Three scruples.*
Scrupulus *The scruple*		Grana viginti *gr.* *Twenty grains.*

Apposuimus notas quibus est consuetum
We have placed the signs by which it is customary

designare quodque pondus.
to designate every weight.

Mensura liquidorum etiam est dispar, alia
The measure of liquids also is unlike, one

propria cerevisiæ, alia vino; nos adhibemus
peculiar to ale, the other to wine; we employ

posteriorem que utimur mensuris liquidorum
the latter and we use the measures of liquids

deductis ex congio vinario.
derived from the wine gallon.

Congius vinarius definitus est legibus
The wine gallon is defined by the laws

regni, quem ad usus medicinales dispertimus
of the realm, which for medicinal uses we divide

sic, viz.
*thus, namely:**

---

* Ne quis error nascatur ex nominibus,
Lest any error should arise from the names,

quæ imposita sunt ponderibus et mensuris
which are applied to weights and to measures

83
3
24
70
480

480
3
) 1440

Congius *A gallon*	C		Octarios octo *Eight pints.*	O
Octarius *A pint*		habet	Fluiduncias sedecim *Sixteen fluid ounces.*	f℥
Fluiduncia *A fluid ounce*		*contains*	Fluidrachmas octo *Eight fluid drams.*	fʒ
Fluidrachma *A fluid dram*			Minima sexaginta *Sixty minims.*	♏

Apposuimus notas quibus designamus
We have placed the signs by which we designate
quamque mensuram.
every measure.

Est videndum ne quid cupri,
It is to be observed whether any thing of copper,

---

nullo discrimine, finximus
without any discrimination, we have invented
nova quædam [nomina,] non inconsultè, quæ
certain new [names,] not inconsiderately, which
brevis usus reddet facilia.
a little use will render familiar.

Ad hæc metimur mensurâ vitreâ, signatâ
Likewise we measure with a glass measure, graduated
intervallis æqualibus, minimas partes liquidorum.
at equal distances, the smallest parts of liquids.
Etenim numerus guttarum est fallax et
For the number of drops is deceptive and
incertus, ferè bis totidem
uncertain, [there being] almost twice as many
guttis tincturæ cujuslibet, quot aquæ, implentibus
drops of any tincture, as of water, for filling
eandam mensuram.
the same measure.

aut plumbi, insit in materia ex qua
or of lead, be present in the material from which

mortaria, mensuræ, infundibula, aut alia vasa
mortars, measures, funnels, or any vessels

fiunt, in quibus medicamenta seu
are made, in which medicines either

præparantur sive servantur ; itaque
are prepared or kept ; therefore

fictilia, vitrifacta plumbo, sunt
earthen wares, glazed with lead, are

aliena.
improper.

Oportet servare acida, alkalina,
It is necessary to keep acid, alkaline,

terrea, præparata metallica, tum sales
earthy, (and) metallic preparations, also salts

omnis generis, in vasis vitreis obturatis.
of every kind, in glass vessels stopped.

Metimur gradum Caloris thermometro
We measure the degree of heat by the thermometer

Fahrenheitiano ; et cum præcipimus
of Fahrenheit ; and when we order

CALOREM FERVENTEM, intelligimus istum qui
a boiling heat, we mean that which

notatur ducentesimo duodecimo gradu.
is marked at the two hundred and twelfth degree.

Verò CALOR LENIS indicat eum qui est
But a gentle heat means that [heat] which is

inter nonagesimum et centesimum gradum.
between the ninetieth and the hundredth degree.

Quoties mentio fit PONDERIS SPECIFICI,
As often as mention is made of specific weight,

ponimus id, de quo agitur,
we suppose the thing, concerning which it is treated,

esse quinquagesimi quinti gradûs caloris.
to be of the fifty-fifth degree of heat.

BALNEUM AQUOSUM fit ubi res quælibet,
A water bath is made when any thing,

contenta suo vase, exponitur aut
contained in its vessel, is exposed either

aquæ ferventi ipsi, aut vapori ejus,
to boiling water itself, or to the vapour of it,

ut incalescat.
that it may be heated.

BALNEUM ARENÆ fit ex arena paulatim
A bath of sand is made from sand gradually

calefacienda, in quam res quælibet imponitur
heated, into which any thing is placed

contenta suo vase.
contained in its vessel.

MATERIA MEDICA.

EXPLANATIONS.

N. O. Natural Order.—*L.* Linnæus.—*J.* Jussieu.—Prop. Properties.—Off. Prep. Officinal Preparations.

In secundo ordine*	VEGETABILIA	designantur	
In the second column,	*VEGETABLES*	*are named*	
ex Speciebus	Plantarum	Linnæi,	editis à
from the Species	*of Plants*	*of Linnæus,*	*edited by*
Willdenow;	ANIMALIA	secundum	Systema
Willdenow;	*ANIMALS*	*according to*	*the System*
Naturæ	Linnæi	editum	à Gmelin;
of Nature	*of Linnæus*	*edited*	*by Gmelin;*
	RES CHEMICÆ		
[*and*]	*CHEMICAL ARTICLES*		[*according to*]
nominibus recentioribus,	nisi sit	indicatum aliter.	
the newer names,	*unless it be*	*expressed otherwise.*	

ABIETIS RESINA. *Resin of the Spruce Fir.*—Pinus Abies. *The Spruce Fir.* Monœcia Monadelphia. *N. O.* Coniferæ. This tree grows wild in Norway and the North of Europe. The concrete resin called *thus*, or *frankincense*, is a natural exudation from the bark.—The same tree also yields the *Pix abietina*, which see.—Prop. Stimulant and corroborant, internally.—Dose, ℈j. to ʒj.; but it is principally used externally in plasters and ointments as a stimulant.—Off. Prep. *Empl. Galban. comp.; Empl. Opii; Empl. Picis comp.*

* See the original.

ABSINTHIUM. *Wormwood.*—Artemisia Absinthium. *Common Wormwood.* Syngenesia Superflua. *N. O.* Compositæ Nucamentaceæ, *L.* Corymbiferæ, *J.* This indigenous perennial plant grows in waste places, and flowers in August. The aroma of the plant is owing to an essential oil; the bitterness to extractive matter.—PROP. Tonic, stomachic, vermifuge.—DOSE, ℈j. to ʒj. but the form of infusion is the best mode of exhibition.

ACACIÆ GUMMI. *Gum Acacia*, or *Gum Arabic.*—Acacia Vera. *The Acacia Tree.* Polygamia Monœcia. *N. O.* Lomentaceæ, *L.* Leguminosæ, *J.* Africa. The gum appears to be the effect of disease, as it is produced by the most unhealthy trees. It is demulcent and nutritive, and may be taken ad libitum.—OFF. PREP. *Mucilago Acaciæ ; Mistura Cornu usti ; Mist. Cretæ ; Mist. Moschi ; Confect. Amygdalarum ; Pulvis Cretæ comp. ; Pulvis Tragacanthæ comp.*

ACETOSÆ FOLIA. *Sorrel Leaves.*—Rumex Acetosa. *Common Sorrel.* Hexandria Digynia. *N. O.* Holoraceæ, *L.* Polygoneæ, *J.* Grows in meadows and pastures, and flowers in July. Indigenous. Perennial. The virtues and acidity of the plant are dependant on the binoxalate of potash. The juice is given in DOSES of f℥ss. to f℥ij. as a refrigerant, and the fresh leaves may be eaten ad libitum.

ACETOSELLA. *Wood-sorrel.*—Oxalis Acetosella. *Common Wood-sorrel.* Decandria Pentagynia. *N. O.* Gruinales, *L.* Gerania, *J.* The leaves much resemble those of common clover. Indigenous. Perennial. Flowers in April and May. The virtues of this plant like those of the former depend on the binoxalate of potash. —PROP. Refrigerant.—DOSE, of the juice f℥ss. to f℥ij.

ACETUM. *Vinegar.*—It is chiefly obtained from the acetous fermentation of malt liquor. It contains acetic acid, water, a small portion of alcohol, mucilage, and colouring matter. It also contains sulphuric acid, which the maker is allowed to mix with it, in the proportion of one part to one thousand by weight. Vinegar is also afforded by the acetous fermentation of wine, and then contains supertartrate of potash.—PROP. Antiseptic, diaphoretic.—DOSE, f℈j. to f℥ss. The steam of it may be inhaled in putrid sore throats; and it may be used externally in bruises, sprains, chilblains, &c.—OFF. PREP. *Acidum aceticum dilutum; Cataplasma Sinapis; Ceratum Saponis; Linimentum Æruginis.* [See Acidum Aceticum dilutum].

ACIDUM ACETICUM FORTIUS. *Stronger Acetic Acid.* Acidum Aceticum è ligno destillatum. *Acetic acid distilled from wood.* vulg. *Pyroligneous Acid.*—Procured from the destructive distillation of wood in iron cylinders. Oxygen, hydrogen, and carbon being liberated by heat, reunite and form acetic acid, which comes over at first mixed with thick tarry matter, from which it is in some measure freed by a second distillation. Charcoal from the wood remains in the retort. The acid is next saturated with lime—an impure acetate of lime is formed, which is decomposed by sulphate of soda; sulphate of lime and acetate of soda are the result; the latter is then decomposed by sulph. acid, and the acetic acid is brought over by distillation. It is colourless and transparent, and, when properly prepared, nearly destitute of empyreumatic odour. It is stated by the College that the specific gravity of this acid is to the specific gravity of water, as 1.046 to 1.000, and that 87 grains of the crystals of the subcarbonate of soda are saturated by 100 grains of this acid. The sp. gr. however, forms no criterion of its strength. It is usually about six times the strength of *acidum aceticum dilutum*, and may readily be reduced to the strength of that preparation by dilution with water.—PROP. The same as common vinegar.—OFF. PREP. *Potassæ Acetas; Plumbi Acetas.* Being free from the mucilage of common vinegar, it is preferable as a pharmaceutical agent.

ACIDUM CITRICUM. [See the preparation in the *Pharmacop.*]

ACIDUM SULPHURICUM. *Sulphuric Acid*, commonly called *Oil of Vitriol.*—The manner in which it is prepared at Nordhausen, in Germany, consists in distilling the sulphate (*protosulphate*) of iron. This salt contains seven atoms of water of crystallization. It is first submitted to heat, which drives off six atoms of the water, and then by distillation part of its acid is brought over with the remaining atom of water of the salt, while the other portion of the acid is decomposed by the heat required for conducting the process, and is converted into oxygen and sulphurous acid. The whole of the latter is given off in the form of gas, and part of the oxygen unites with the protoxide of iron of the salt, converting it into peroxide, which remains in the retort, and the other portion of oxygen escapes as gas.—Sulph. Acid is prepared in this country by burning eight parts of sulphur with one part of nitrate of potash, in a furnace so constructed as to convey the gaseous products of the combustion into a chamber lined with lead, having a hole at the top to admit atmospheric air, and water at the bottom to the depth of several inches. The theory of the process has been variously described, but the following description will perhaps suffice without entering into more minute detail: the sulphur during combustion forms sulphurous acid, by uniting with the oxygen of the air of the chamber, and the nitric acid of the nitrate of potash is resolved into nitric oxide and oxygen gases; the former of these is converted into nitrous acid gas by union with oxygen; so that we have in the chamber sulphurous acid and nitrous acid gases, which would have no action on each other in a perfectly dry state, but as the sulphurous acid becomes absorbed by the water it takes oxygen from the nitrous acid, which is thus reduced to nitric oxide; this rising to the hole at the top of the chamber gets a supply of oxygen from the atmospheric air, and is again converted into nitrous acid gas, which is carried down by its specific gravity and imparts oxygen as before to the sulphurous acid. The process goes on in this manner, the nitric oxide acting as a carrier of oxygen from the air to the sulphurous acid. It is to be observed that during the above changes a white crystalline solid is continually forming, which is supposed by different chemists to be differently constituted. According to the above theory it is considered a compound of sulphurous acid, nitrous acid, and watery vapour, and on descending to the water at the bottom of the chamber, the changes already alluded to take place. The acid ought next to be distilled in a platinum or glass retort, to free it from sulphate of potash and sulphate of lead, which are formed from the nitrate of potash and the lead of the chamber. When first prepared it is colourless, but is generarlly met with of a brown and frequently of a black colour, occasioned by the carbonaceous matter of animal or vegetable substances with which it has accidentally come in contact. Its sp. gr. as stated by the college is to distilled water, as 1.850 to 1.000. Liquid sulph. acid consists of water and dry sulph. acid, and when most concentrated contains only one atom of water ; but it will unite with water in all proportions. Dry sulphuric acid is the acid free from water, as it exists in combination with salifiable bases. On diluting it with water heat is evolved. See *Acidum Sulph. dilut.* of the *Pharmacop.* ; also see the same preparation for its internal exhibition. Externally applied it is rubefacient, and stimulant. It is applied in the form of ointment, consisting of f℈j. mixed with ℥j. of lard, or of half this strength in scabies.—Off. Prep. *Acid. sulph. dilut.*; *Ferri Sulphas*; *Zinci Sulphas*; *Hydrarg. Oxymur.*; *Hydrarg. Submurias*; *Æther Sulphuricus.*

ACONITI FOLIA. *Aconite, or Monkshood Leaves.*—Aconitum Napellus. *Wolfsbane. Aconite. Monkshood.* Polyandria Trigynia. *N. O.* Multisiliquæ, *L.* Ranunculaceæ, *J.* Germany and Switzerland. Cultivated in gardens, and flowers in June. Perennial.—Prop. Narcotic, sudorific, deobstruent.—Dose, gr. i. to gr. v. or more ; but as the leaves are liable by keeping, to vary in strength, the extract is a better form for exhibition.—Off. Prep. *Extractum Aconiti.*

ADEPS. *Hog's Lard.*—Sus Scrofa. *The Hog. Class.* Mammalia. *Ord.* Belluæ, *L.* Under the form of *Adeps præparata,* lard is used in preparing plasters, ointments, liniments, cerates, &c. being an emollient. Lard may be purchased sufficiently pure for pharmaceutical purposes.

ÆRUGO. *Verdigris.* Called *impure Subacetate of Copper.*—Together with many impurities it consists of acetate, and carbonate of copper ; it also contains black oxide of copper, and some particles of metallic copper. It is made by placing plates of copper between moistened layers of the husks of grapes after they come out of the wine press, which undergoing fermentation give rise to acetic acid ; the copper becoming at the same time oxidized, combines with the acetic acid, and with carbonic acid from the atmosphere.—PROP. Alterative, tonic, in DOSES of gr. $\frac{1}{8}$, to gr. $\frac{1}{2}$; Emetic in DOSES of gr. i. to gr. ij. Externally applied it is detergent, and escharotic. It is a dangerous medicine at best, and is now seldom or never used. It ought to be confined to external purposes only.—OFF. PREP. *Linimentum Æruginis.*

ALLII RADIX. *Garlick Bulbs.*—Allium Sativum. *Garlick.* Hexandria Monogynia. *N. O.* Spathaceæ, *L.* Asphodeli, *J.* Sicily. Perennial.—PROP. Stimulant, expectorant, diuretic.—DOSE, of the juice, f℥j. to f℥ij. in syrup. Externally it is rubefacient and stimulant.

ALOES SPICATÆ EXTRACTUM. *Extract of Spiked Aloes.*—Aloe Spicata. *The spiked or Socotrine Aloe.* Hexandria Monogynia, *N. O.* Coronariæ, *L.* Asphodeli, *J.* Island of Zocotora, and Cape of Good Hope. Perennial.—PROP. Cathartic, emenagogue.—DOSE, gr. x. to ℈j. as a purgative ; as an emenagoue, gr. ij. to gr. iij. twice or thrice a day. It acts on the large intestines, especially on the rectum, for which reason it should not be given where there is a disposition to piles. Its action on the bowels is slow, and does not commence until it has passed the stomach. It warms the system and stimulates the circulation. In certain irritable states of the uterus it ought not to be administered.—OFF. PREP. *Decoctum Aloes C. ; Ext. Aloes ; Ext. Colocynth. C. ; Tinct. Aloes ; Tinct. Aloes C. ; Tinct. Benzoini C. ; Vinum Aloes ; Pulvis Aloes C.; Pil. Aloes C.; Pil. Aloes cum Myrrha ; Pil. Cambogiæ C.*

ALTHÆÆ FOLIA ET RADIX. *Leaves and Root of Marsh-mallow.*—Althæa officinalis. *Marsh-mallow.*

v. Aloin, in Extr. Pharm.

Monadelphia Polyandria. *N. O.* Columniferæ, *L.* Malvaceæ, *J.* Indigenous. It grows in salt marshes, and on the banks of rivers and ditches, flowering in July. Perennial.—PROP. Emollient. Used principally in decoction, to form fomentations, clysters, and gargles.—OFF. PREP. *Syrupus Althææ.*

ALUMEN. *Alum.*—Found native in some parts of the world, sometimes effloresced on bituminous schists, or united with the soil as in volcanic countries. At the Solfatara, near Naples, it is obtained from the soil by mere lixiviation and evaporation; the latter process is carried on in pans sunk in the ground, the heat of which produces the necessary evaporation. It is also procured in much greater quantity from schistose pyritic clays, or alum ores, by a peculiar process.—PROP. Tonic, astringent.—DOSE, gr. v. to gr. xv., or more. Externally, it is used for forming astringent lotions.—OFF. PREP. *Alumen Exsiccatum ; Liquor Alum. comp.*

AMMONIACUM. *Gum Ammoniac.*—Heracleum gummiferum. *Gum-bearing Heracleum.* Pentandria Digynia. *N. O.* Umbellatæ. Africa and the East Indies. Cultivated in the botanical garden, Chelsea, where it grows luxuriantly. It is said that the plant is attacked by a horned beetle, which wounds it, and the gum exudes. The gum is also procured by incisions.—PROP. Expectorant, antispasmodic, stimulant.—DOSE, gr. x. to ʒss. For its external use see *Empl. Ammoniaci,* &c.—OFF. PREP. *Mist. Ammoniaci ; Pil. Scillæ C. ; Empl. Ammoniaci ; Empl. Ammon. cum Hydrarg.*

AMMONIÆ MURIAS. *Muriate of Ammonia.*—Until of late years this salt was imported from Egypt, where it is manufactured by subliming the soot of camel's dung. It is now manufactured in Europe by double decomposition from sulphate of ammonia by adding muriate of soda; the result is sulphate of soda, and muriate of ammonia : the latter is then purified by sublimation. The sulphate of ammonia is prepared by lixiviating the soot of coal, which is highly impregnated with it ; or it is procured for the above purpose by exposing bones, or animal matter, to a red heat with sulphate of lime (*gypsum*); carbonate of ammonia is formed by the decomposition of the animal matter, which being acted upon by the sulphate of lime, carbonate of lime, and sulphate of ammonia are eventually obtained, and the latter salt, being soluble, is easily separated from the insoluble carbonate of lime.—PROP. Muriate of ammonia is aperient, and diaphoretic. It is, however, now confined to external application as a discutient in lotions. It produces cold and relieves inflammation, if applied during its solution: dissolved with equal parts of nitrate of potash in a proper quantity of water, a considerable reduction in the temperature of the latter is the consequence, and a useful extemporaneous cold lotion is produced.

AMYGDALÆ AMARÆ ET DULCES. *Bitter* and *sweet Almonds.*—Amygdalus Communis. *The almond-tree.* Icosandria Monogynia. *N. O.* Pomaceæ, *L.* Rosaceæ, *J.* These trees are natives of most countries bordering on the Mediterranean.—Both *bitter* and *sweet* almonds yield by expression a mild sweet oil, which is demulcent, and may be exhibited in DOSES of ℥iij. or more, in form of emulsion. By distilling with water the cake, which comes out of the press after the expression of the fixed oil from the bitter almond, an essential oil is obtained which is highly poisonous. Its deleterious properties appear to be owing to hydrocyanic acid being in combination with the essential oil. The bitter almond is sedative and diuretic.—OFF. PREP. *Mist. Amygdalæ; Oleum Amygdalæ; Confectio Amygdalæ.*

AMYLUM. *Starch.*—Triticum Hybernum. *Winter Wheat.* Triandria Monogynia. N. O. Gramina. Annual. Starch is the fecula of wheat, and is obtained by steeping wheat, either whole or bruised, in cold water. When it swells and yields a milky juice by pressure, it is put in coarse bags, which are placed in vats filled with water, and it is then submitted to pressure as long as any milky juice is afforded. The bags are then removed, and the fecula subsides, and is purified and dried by subsequent manipulation.—PROP. Demulcent. Principally used for clysters.—Off. Prep. *Mucilago Amyli; Pulv. Tragacanth. C.*

ANETHI SEMINA. *Dill Seeds.*—Anethum graveolens. *Common Dill.* Pentandria Digynia. *N. O.* Umbellatæ. Annual. Spain and Portugal.—The virtues reside in an essential oil.—Prop. Carminative, in doses of gr. xv. to ʒj. or more, in powder.—Off. Prep. *Aqua Anethi.*

ANISI SEMINA. *Anise-Seeds.*—Pimpinella Anisum. *Anise.* Pentandria Digynia. *N. O.* Umbellatæ. This is an annual plant, flowering in July; and if the season prove warm, the seeds will ripen in autumn. It is a native of Egypt, but is cultivated in Malta and Spain, whence the seeds are imported into England. The virtues of the seeds reside in an essential oil. They are carminative.—Dose, gr. xv. to ʒj. or more.—Off. Prep. *Oleum Anisi; Spiritus Anisi.*

ANTHEMIDIS FLORES. *Chamomile Flowers.*—Anthemis nobilis. *Common Chamomile.* Syngenesia Superflua. *N. O.* Compositæ Discoideæ, *L.* Corymbiferæ, *J.* Indigenous. Perennial. Grows on commons. Flowers in July and August. The aroma of the plant resides in essential oil, the bitterness in extractive matter.—Prop. Stomachic, tonic. The warm infusion proves powerfully emetic, and is given to assist the action of emetics.—Dose, gr. x. to ʒj powdered.—Off. Prep. *Infusum Anthemidis; Ext. Anthemidis; Oleum Anthemid.*

ANTIMONII SULPHURETUM. *Sulphuret of Antimony.*—Found native, combined with various impurities, from which it is separated by roasting the ore. It is of importance to procure it unadulterated, for when carelessly manufactured the loaves, called *crude antimony*, contain lead, and frequently arsenic, iron, and manganese. It ought never to be purchased in the form of powder.—Use. It is chiefly employed in making some of the preparations of antimony of the Pharmacopœias, and is seldom given alone, as its action cannot be depended upon.—Off. Prep. *Antimonii Sulphuretum præcipitatum; Pulvis Antimonialis.*

ANTIMONII VITRUM. *Glass of Antimony.*—This is prepared by heating the *sulphuret* after a peculiar method; the greater part of the sulphur is driven off, and oxygen is obtained from the air by the antimony: the compound also acquires silica from the crucible in which it is made. It consists, therefore, of protoxide of antimony, silica, and a little sulphur, in proportions liable to vary from the uncertain method of preparing the compound.—USE. It was introduced in the present edition of the Pharmacopœia, for making the *Antimonium Tartarizatum.* It is never employed medicinally.

ARGENTUM. *Silver.* Found native and mineralized in several countries. See *Argenti Nitras.*

ARMORACIÆ RADIX. *Horse Radish Root.*—Cochlearia Armoracia. *Horse Radish.* Tetradynamia Siliculosa. *N. O.* Siliquosæ, *L.* Cruciferæ, *J.* Indigenous, perennial; grows in moist places, and flowers in May.—PROP. Diuretic, antiscorbutic, stimulant.—DOSE, ad libitum. Its pungency depends on a volatile oil.—OFF. PREP. *Infus. Armoraciæ C.; Spiritus Armoraciæ C.*

ARSENICUM ALBUM. *White Arsenic. Arsenious Acid.*—This is chiefly supplied from Saxony, and is procured by roasting ores of cobalt in making zaffre, or by sublimation from arsenical pyrites. *Metallic* arsenic is not poisonous; but when combined with oxygen as in the *white arsenic* or *arsenious acid,* it then becomes the most virulent of poisons. Notwithstanding, *white arsenic,* when properly managed, is an useful tonic. It is best and safest administered in solution: [See *Liquor Arsenicalis.*] Externally applied it is escharotic, and is said to form an useful application for cancerous sores. A number of facts serve to shew that arsenic destroys life when externally applied, and therefore every form of its exhibition requires great caution.—OFF. PREP. *Arsenicum Album sublimatum; Liquor Arsenicalis.*

ASARI FOLIA. *Leaves of Asarabacca.*—Asarum Europœum. *Asarabacca.* Dodecandria. Monogynia. *N. O.* Sarmentaceæ, *L.* Aristolochiæ, *J.* Indigenous. Perennial. Found in woods. Flowers, dark purple, appearing in May.—PROP. Powerfully cathartic and emetic.

In modern practice it is only employed as an errhine; gr. iij. to gr. v. snuffed up the nostrils every night relieve cephalæa, chronic opthalmia, &c.

ASSAFŒTIDÆ GUM RESINA. *Gum Resin of Assafœtida.*—Ferula Assafœtida. *Assafœtida.* Pentandria Digynia. *N. O.* Umbellatæ. Native of Persia. Perennial. The root is cut transversely, and a white juice exudes, which is scraped off, and then the root is cut again and again till the whole of the juice flows, which becomes concrete and darker by exposure to the air.—PROP. Antispasmodic, stimulant, expectorant, anthelmintic.—DOSE, gr. v. to ℥ss.—OFF. PREP. *Mist. Assafœtidæ; Tinct. Assafœtidæ; Spiritus Ammoniæ Fœtidus; Pil. Galbani Comp.*

AVENA SEMINA. *Oats.*—Avena Sativa. *Common Oat.* Triandria Digynia. *N. O.* Gramina, *L.* Chili. Annual.—USE. To form gruel, which is a good demulcent in inflammatory diseases, &c., and which is also useful for glysters.

AURANTII BACCÆ ET CORTEX. *Seville Oranges and the Peel.*—Citrus Aurantium. *The Orange Tree.* Polyadelphia Icosandria. *N. O.* Pomaceæ, *L.* Aurantii, *J.* The orange tree is a native of India, Persia, and China, but is now cultivated in several countries. The peel contains an essential oil, and is tonic: the juice is refrigerant. The dried unripe fruit called Curaçoa oranges, is employed for keeping open issues. The difference between orange and lemon juice is, in the former containing less citric acid and more saccharine matter than the latter.—OFF. PREP. *Inf. Aurantii C.; Infus. Gentianæ C.; Spiritus Armoraciæ C.; Tinct. Aurantii; Tinct. Cinchonæ C.; Tinct. Gentianæ C.; Syrupus Aurantii; Confectio Aurantii.*

BALSAMUM PERUVIANUM. *Peruvian Balsam.*—This and the BALSAMUM TOLUTANUM, *Balsam of Tolu*, are given in the list of *Materia Medica* as being the produce of two different trees; the former as that of the *Myroxylon Peruiferum;* the latter as the produce of the *Toluifera Balsamum.* But it is now ascertained that they are both the produce of the Myroxylon Peruiferum. *Sweet-smelling Balsam Tree.* Decandria Monogynia. *N. O.* Lomentaceæ, *L.* Leguminosæ, *J.* South America.—The *Peruvian Balsam* is procured by boiling the twigs of the tree in water. Its composition is benzoic acid, essential oil, and resin.—Prop. Stimulant, tonic, expectorant.—Dose, gr. x. to ʒss. Externally, it cleanses indolent and foul ulcers.—*Balsam of Tolu* is obtained in a liquid state by making incisions into the tree early in the spring, and it is hardened by exposure to the air. Its composition is like the former.—Prop. Stimulant and expectorant.—Dose, gr. x. to ʒss. Neither of these balsams should be exhibited in active inflammations of the lungs.—Off. Prep. *Tinct. Benzoini C.; Syrupus Tolutani.*

BELLADONNÆ FOLIA. *Leaves of Deadly Nightshade.*—Atropa Belladonna. *Deadly Nightshade.* Pentandria Monogynia. *N. O.* Luridæ, *L.* Solanaceæ, *J.* Indigenous. Perennial. Flowers in June, and grows in shady places. The narcotic property of this plant resides in the vegetable alkali *atropia.* The whole plant is poisonous.—Prop. Sedative, narcotic, diaphoretic, diuretic.—Dose, gr. ½ to gr. iii., which may be further increased with caution. [See *Ext. Belladonnæ.*] A fomentation or poultice, formed with the leaves, relieves the pain of cancerous sores; and applied to the penis, they prevent priapism and relieve chordee.—Off. Prep. *Ext. Belladonnæ.*

BENZOINUM. *Gum Benjamin.*—Styrax Benzoin. *Benjamin Tree.* Decandria Monogynia. *N. O.* Bicornes, *L.* Guaiacinæ, *J.* Native of Sumatra. The gum is obtained by wounding the bark of the lower branches near their commencement. It consists of benzoic acid and resin.—Prop. Expectorant, stimulant.—Dose, gr. x. to ʒss. It is now seldom used, except for procuring the acid. —Off. Prep. *Acid. Benzoin.; Tinct. Benzoini C.*

BISMUTHUM. *Bismuth.*—This metal is found native or in combination with sulphur, oxygen, or other metals. It is found plentifully in Saxony, and is met with in other parts of the continent and in Cornwall. It is brittle, shining, of a reddish-white colour, and lamellated. Sp. gr. about 10. Fuses at 476°. See *Bismuthi Subnitras*, Pharmacop.

BISTORTÆ RADIX. *Root of Bistort.*—Polygonum Bistorta. *Great Bistort* or *Snake-weed.* Octandria Trigynia. *N. O.* Oloraceæ, *L.* Polygoneæ, *J.* Indigenous. Perennial. Grows in moist meadows. The flowers are small, of a pale rose colour, appearing in May and June. The virtues of the root reside in tannin and gallic acid.—PROP. Strongly astringent.—DOSE, gr. x. to ʒj.

CAJUPUTI OLEUM. (*Essential*) *Oil of Cajuput.*--Melaleuca Cajuputi. *The Cajuputa Tree.* Polyadelphia Icosandria. *N. O.* Hesperideæ, *L.* Myrti, *J.* This tree-like shrub is a native of Amboyna.—PROP. The oil is stimulant, antispasmodic, sudorific.—DOSE, ♏. ii. to ♏. v. dropped on sugar. It is also employed externally as a local stimulant mixed with olive oil. It also relieves the tooth-ache.

CALAMINA. *Calamine. Impure Carbonate of Zinc.*—This ore is found in some parts of England and Wales, and is one of those from which metallic zinc is obtained. [See *Calamina præparata.*]

CALAMI RADIX. *Root of the Sweet Flag.*—Acorus Calamus. *The Sweet Flag.* Hexandria Monogynia. *N. O.* Piperitæ, *L.* Aroideæ, *J.* Indigenous. The root is perennial, growing in marshes and rivulets. The plant flowers in May and June. The aroma of the root resides in an essential oil: the root also contains bitter extractive and fecula.—PROP. Aromatic, tonic.—DOSE, ℈j. to ʒj. in powder: it may also be given in infusion. It is found very efficacious in intermittents.

CALUMBA. *Calumba.*—*Cocculus palmatus* of De Candolle, is the *Menispermum palmatum* of Willdenow. Diœcia Dodecandria. *N. O.* Menispermeæ. Native of the south-east part of Africa, growing in the forests of Mozambique.—PROP. Tonic, stomachic, without being astringent.—DOSE, gr. x. to ℈j. in powder.—OFF. PREP. *Infus. Calumbæ; Tinct. Calumbæ.*

CAMBOGIA. *Gamboge.*—Stalagmitis Cambogioides.

The Gamboge Tree. Polygamia Monœcia. *N. O.* Tricoccæ. Native of Siam and Ceylon: at the former of these places the gamboge is obtained in drops by breaking the leaves and young shoots; at the latter place it is obtained by wounding the bark of the tree with a sharp stone.—PROP. Hydragogue and drastic cathartic. —DOSE, gr. iſs. to gr. vj. It ought to be exhibited cautiously; and is best combined with other purgatives.—OFF. PREP. *Pil. Cambogiæ comp.*

CAMPHORA. *Camphor.*—Laurus Camphora. *The Camphor Laurel.* Enneandria Monogynia. *N. O.* Oleraceæ, *L.* Lauri, *J.* Japan, China, North America. Camphor is obtained by distilling the roots and smaller branches of the tree in a peculiar manner. Camphor, however, is obtained chiefly at Sumatra from a tree (the *Dryobalanops Camphora*) which is not of the *Laurel* genus. The trees are cut and split, and in the middle is found concrete camphor. It is brought in a crude state to Europe, where it is purified by sublimation.—PROP. Antiseptic, stimulant, narcotic, sudorific, antispasmodic. —DOSE, gr. ij. to ℈j.—OFF. PREP. *Mist. Camphoræ; Spiritus Camphoræ; Tinct. Camphoræ C.; Linimentum Camphoræ; Liniment. Camphoræ C.; Linimentum Saponis; Linimentum Hydrargyri.*

CANELLÆ CORTEX. *Canella Bark.*—Canella Alba. *White Canella Tree.* Dodecandria Monogynia. *N. O.* Oleraceæ, *L.* Meliaceæ, *J.* West Indies. The virtues partly reside in an essential oil.—PROP. Stimulant, aromatic, stomachic.—DOSE, gr. x. to ʒss. powdered.—OFF. PREP. *Vinum Aloes.*

CANTHARIS. *Blistering Fly.*—Cantharis vesicatoria. Insecta Coleoptera, *L.* South of Europe.—PROP. Internally, powerfully stimulant and diuretic. The DOSE should not exceed gr. j. They are exhibited in certain cases of incontinence of urine arising from atony; also in gleets, impotency, and dropsy. Externally, they are employed as a vesicatory.—OFF. PREP. *Tinct. Cantharidis; Emplastrum Cantharidis; Ceratum Cantharidis; Unguentum Cantharidis.*

CAPSICI BACCÆ. *Capsicum Berries. Cayenne Pep-*

per.—Capsicum annuum. *Annual Capsicum.* Pentandria Monogynia. *N. O.* Luridæ, *L.* Solaneæ, *J.* Native of the East and West Indies. The pungency of Capsicum resides in a peculiar resinous principle.—PROP. Stimulant, aromatic.—DOSE, gr. vj. to gr. x. or more in pills.—OFF. PREP. *Tinctura Capsici.*

CARBO LIGNI. *Charcoal.*—This substance ought to be employed fresh prepared, or after preparation it should be kept in close stopped bottles, otherwise it absorbs air and moisture.—PROP. Antiseptic.—DOSE, gr. x. to ℈j. It corrects putrid eructations. It may be used externally in poultices with bread or linseed to cleanse foul fœtid ulcers, and gangrenous sores.

CARDAMINES FLORES. *Cardamine Flowers.*—Cardamine Pratensis. *Cardamine, or Cuckoo-flower. Ladies' Smock.* Tetradynamia Siliquosa. *N. O.* Siliquosæ, *L.* Cruciferæ, *J.* Perennial. Indigenous. Meadows and pastures. Flowers in April and May.—PROP. Diuretic, antispasmodic.—DOSE. ʒj. to ʒiij. in powder. Their effects are, however, very doubtful.

CARDAMOMI SEMINA. *Cardamom Seeds.*—Matonia Cardamomum. *The Cardamom Tree.* Monandria Monogynia. *N. O.* Scitamineæ, *L.* This perennial plant is a native of India. The seeds contain an essential oil. —PROP. Carminative, stomachic.—DOSE, gr. v. to ℈j. powdered. They are chiefly employed as a warm adjuvant to other medicines.—OFF. PREP. *Ext. Colocynth. C.; Tinct. Cardamom.; Tinct. Cardamom C.; Tinct. Cinnamomi C.; Tinct. Gentianæ C.; Tinct. Rhei; Tinct. Sennæ; Spiritus Ætheris Aromaticus; Confectio Aromatica; Pulvis Cinnamomi C.*

CARICÆ FRUCTUS. *Figs.*—Ficus Carica. *The Fig Tree.* Polygamia Diœcia. *N. O.* Scabridæ, *L.* Urticæ, *J.* Native of Asia, but is now found in the south of Europe.—PROP. Figs are demulcent and aperient. They are wholesome and nutritive, and are eaten as a delicacy; but if taken in too large a quantity, they are apt to occasion a griping pain in the bowels, succeeded by diarrhœa. They are sometimes used as poultices for gumboils, &c.--OFF. PREP. *Decoct. Hordei C.; Conf. Sennæ.*

CARUI SEMINA. *Carraway Seeds.*—Carum Carui. *Common Carraway.* Pentandria Digynia. *N. O.* Umbellatæ. This indigenous biennial plant grows in meadows, and flowers in May and June; the seeds ripen in August. Their virtues reside in an essential oil.—PROP. Carminative, stimulant, stomachic.—DOSE, gr. x. to ℨiſs. in substance.—OFF. PREP. *Oleum Carui; Aqua Carui; Spiritus Carui; Spiritus Juniperi comp.; Tinct. Cardamom. C.; Tinct. Sennæ; Confectio Opii; Confectio Rutæ; Empl. Cumini.*

CARYOPHYLLI. *Cloves.*—Eugenia caryophyllata. *The Clove Tree.* Icosandria Monogynia. *N. O.* Hesperideæ, *L.* Myrti, *J.* Native of the Moluccas. Cloves are the unexpanded flower-buds dried. Their virtues reside in an essential oil which is heavier than water.—PROP. Highly stimulant and aromatic.—DOSE, gr. v. to gr. x. in powder; or of the oil ♏ij. to ♏vj. on sugar. The oil is principally used to correct the griping action of some of the extracts, and is said to relieve the tooth-ache.—OFF. PREP. Cloves enter into *Infusum Caryophyllorum; Vinum Opii; Confectio Aromatica; Confectio Scammoneæ; Spiritus Ammoniæ Aromaticus.*

CASCARILLÆ CORTEX. *Cascarilla Bark.*—The specific name *(Croton Cascarilla)* adopted by the College is erroneous; the bark in question being altogether different from that of the Cascarilla of Linnæus.—Croton Eluteria. *Elutheria.* Monœcia Monadelphia. *N. O.* Tricoccæ, *L.* Euphorbiaceæ, *J.* This tree is a native of the Bahama and West India islands. The bark yields a volatile oil, bitter extractive, and resin.—PROP. Tonic and carminative, and at the same time expectorant.—DOSE, gr x. to ℨss. in powder.—OFF. PREP. *Infusum Cascarillæ; Tinctura Cascarillæ.*

CASSIÆ PULPA. *Cassia Pulp.*—Cassia Fistula. *Purging Cassia.* Decandria Monogynia, *N. O.* Lomentaceæ, *L.* Leguminosæ, *J.* Native of Egypt and Western Africa, and the East and West Indies. The pulp is contained in long, round, pendulous pods, and the seeds are imbedded in it.—PROP. Gently laxative.—

Dose, ʒiij. to ℥j. or more.—Off. Prep. *Confectio Cassiæ ; Confectio Sennæ.*

CASTOREUM. *Castor.* Castor Fiber. *The Castor Beaver.*—Mammalia, Glires, *L.* An amphibious animal, native of Russia and America. Castor is a peculiar matter found in the bags situated between the anus and external genitals of the animal, and when first collected it is in a fluid state. The best castor comes from Russia, but the markets are supplied from Canada.—Prop. Antispasmodic, emmenagogue.—Dose, gr. x. to ʒss. powdered and made into a bolus with syrup.—Off. Prep. *Tinctura Castorei.*

CATECHU EXTRACTUM. *Extract of Catechu.*—Acacia Catechu. *Catechu.* Polygamia Monœcia. *N. O.* Lomentaceæ, *L.* Leguminosæ, *J.* This tree is a native of Indostan. The extract is prepared by cutting the inner, or heart wood, which is of a dark colour, into chips, and then pouring water upon it ; this is evaporated to about half by boiling, and the decoction, without straining, is poured into a vessel to cool, and then evaporated by the heat of the sun. When reduced to a certain consistence, it is spread upon a mat, or cloth, covered with ashes of cow-dung, and divided into square pieces with a string, which are then fully dried by exposing them to the sun. Catechu contains tannin, gallic acid, extractive matter, mucilage, and earthy and other impurities.—Prop. Astringent.—Dose, gr. x. to ℈ij., or more.—Off. Prep. *Infusum Catechu C. ; Tinctura Catechu.*

CENTAURII CACUMINA. *Tops of Centaury.* Chironia Centaurium. *Common Centaury.* Pentandria Monogynia. *N. O.* Rosaceæ, *L.* Gentianæ, *J.* An indigenous annual plant ; grows in pastures, and flowers in July and August.—Prop. Tonic.—Dose, ʒss. to ʒj. in powder ; or it may be given in infusion.

CERA ALBA and CERA FLAVA. *White* and *yellow Wax.* Wax is secreted by the bee from certain substances collected from the nectaries of plants, and not procured by the insect ready formed in the anthers of flowers, as was commonly believed. It is composed of oxygen, hydrogen, and carbon. The white sort only differs from the yellow in being deprived of the colouring matter and odour by the process of bleaching, which is effected by exposing the wax to the sun in *very* thin layers and sprinkling it with water from time to time, and turning it.—PROP. Wax made into an emulsion, has been given internally in diarrhœas, and dysenteries ; but it is now chiefly used in external applications, and enters into the composition of *Cerates, Ointments, and Plasters.*

CEREVISIÆ FERMENTUM. *Yeast of Beer.*—The fermenting principle of yeast, and the cause of its being able to excite fermentation, are alike unknown. It is supposed to be analagous to gluten. Yeast contains the bitter of the hop, alcohol, and carbonic acid.—PROP. Antiseptic, tonic.—DOSE, ℥ss. every two or three hours. For its external use see the OFF. PREP. *Cataplasma Fermenti.*

CETACEUM. *Spermaceti.*—Physeter Macrocephalus. *The Spermaceti Whale.* Mammalia Cetaceæ, *L.* The Spermaceti Whale is found almost exclusively in the Great Southern Ocean, but is sometimes seen in the North Seas. The spermaceti is contained in the head of the animal, in a triangular bony cavity covered only by the common integuments; it is an oily fluid, but after the death of the animal it concretes into a spongy substance, in which state it is brought to this country and purified. Composed of oxygen, hydrogen, and carbon.—PROP. Emollient, demulcent.—DOSE, ℈j. to ʒij., made into an emulsion with yolk of egg.—OFF. PREP. *Ceratum Cetacei ; Unguentum Cetacei.*

CINCHONÆ CORDIFOLIÆ CORTEX. *Heart-leaved Cinchona. (Yellow Bark.)*

CINCHONÆ LANCIFOLIÆ CORTEX. *Lance-leaved Cinchona (pale or quilled Bark).*

CINCHONÆ OBLONGIFOLIÆ CORTEX. *Oblong-leaved Cinchona. (Red Bark.)*

CINCHONA. Pentandria Monogynia. *N. O.* Contortæ, *L.* Rubiaceæ, *J.* These trees are natives of North and

South America, and are found growing on mountains at considerable heights above the level of the sea. The virtues of the *barks* reside in *Cinchonia** and *Quina*, which are in combination with *kinic acid;* the yellow bark contains the latter of these vegetable alkalies, the pale bark the former, and the red bark both. The barks also contain *kinate of lime, resinous and extractive matter, gluten, and tannin.*—PROP. Tonic, astringent, antiseptic. DOSE, gr. x. to ℨij. or more in powder, which is the best mode of exhibition if it agree with the stomach. When it acts on the bowels, opium may be conjoined with it; and when it occasions costiveness, rhubarb may be added to it. Some stomachs are apt to reject it, in which cases wine, carbonic acid, or some aromatic, such as the *compound powder of Cinnamon*, may be given with it. Some take it best in milk. In intermittent fevers bark has long been known as almost a specific. It is also administered in remittent fevers, and the latter stages of typhus, &c. It is an excellent tonic in gangrene, and may also be applied externally to gangrenous sores in the form of poultice. When it is impossible to be retained in the stomach, it may be exhibited in the form of glyster.—OFF. PREP. Of the above three species the *Cinchona Lancifoliæ* is only ordered *officinally* by the College; it enters into *Infusum Cinchonæ; Decoctum Cinchonæ; Extractum Cinchonæ; Extractum Cinchonæ resinosum; Tinctura Cinchonæ; Tinctura Cinchonæ C.; Tinct. Cinchonæ ammoniata.*

CINNAMOMI CORTEX. *Cinnamon Bark.*—Laurus Cinnamomum. *The Cinnamon Tree.* Enneandria Monogynia. *N. O.* Oleraceæ, *L.* Lauri, *J.* The *inner* bark of this tree, which is a native of Ceylon, is employed. Its virtues reside in an essential oil, which is heavier than water.—PROP. Stimulant, aromatic, astringent, tonic.—DOSE, gr. x. to ℈j. in powder, or ♏j. to ♏iv. of the oil on sugar. Cinnamon is one of the most useful corrigents of nauseous medicines.—OFF. PREP. *Aqua Cin-*

* The manner of obtaining these and other vegetable alkalies is explained in the *Notes* under the head VEGETABLES in the *Pharmacopœia.*

namomi ; Infusum Catechu ; Spiritus Lavandulæ C. ; Tinctura Cardamomi C. ; Tinct. Catechu ; Tinct. Cinnamomi ; Spiritus Ætheris Aromat. ; Vinum Opii ; Confectio Aromatica ; Pulvis Cinnamomi C. ; Pulvis Cretæ C. ; Pulvis Kino comp.

CINNAMOMI OLEUM. [See the last article.]

COCCUS COCHINEAL.—Coccus Cacti. *Cochineal Insect.* Insecta Hemiptera. This insect is brought from Mexico and New Spain. It is used for the purpose of imparting colour to tinctures.—OFF. PREP. *Tinct. Cardamomi C. ; Tinct. Cinchonæ C.*

COLCHICI RADIX ET SEMINA. *The Root and Seeds of Colchicum*, or *Meadow Saffron.*—Colchicum Autumnale. *Meadow Saffron.* Hexandria Trigynia. *N. O.* Spathaceæ, *L.* Junci, *J.* Indigenous, perennial ; flowers in September, and grows in moist meadows. The bulb is large. The flowers, which are naked and purple, proceed from the offset bulbs, after the leaves of the bulb, which throws them off, have withered away. When the flowers have blown the old bulbs decay. The new bulbs arrive at perfection by the following June, and they ought to be collected from that time to August : if gathered at the wrong season of the year, they will be inert. The impregnated germen remains under ground, close to the bulb, till the next spring, at which time the capsule springs up along with the leaves, and the seeds are ripened at the latter end of June. The virtues of the meadow-saffron reside in *veratria.* This principle in the seed, resides in the husk, therefore the seeds should not be bruised when used for making the wine or tincture.—PROP. Narcotic, diuretic, purgative.—DOSE. Of the dried bulb, or seed powdered, gr. ij. to gr. vi. It is, however, by no means eligible to exhibit either the bulb or seed in substance. This medicine is considered as a *specific* in gout and rheumatism. It requires to be administered with caution : [See *poisons.*]—OFF. PREP. The bulb is employed in the *Acetum Colchici ; Vinum Colchici :* the seeds in the *Spiritus Colchici Ammoniatus.*

COLOCYNTHIDIS PULPA. *Pulp of Bitter Cucum-*

ber, or *Bitter Apple.*—Cucumis Colocynthis. *Bitter Cucumber.* Monœcia Monadelphia. *N. O.* Cucurbitaceæ. This annual plant is a native of Turkey and Nubia. The *pulp* is that part contained in the capsule in which the seeds are enveloped. The virtues appear to reside in a peculiar principle, termed *Colocyntine.*—Prop. Drastic cathartic. It is best to exhibit *colocynth* in the form of the extracts combined with other medicines, the pulp being so very violent in its operation.—Off. Prep. *Extractum Colocynthidis; Extract. Colocynth. C.*

CONII FOLIA ET SEMINA. *Leaves and Seeds of Hemlock.*—Conium Maculatum. *Common,* or *Spotted Hemlock.* Pentandria Digynia. *N. O.* Umbellatæ. Indigenous. Biennial. Grows in hedges and its flowers or umbels appear in June and July. The virtues are supposed to reside in an alkali, (*conia*).—Prop. Narcotic.—Dose, gr. iij., which may be increased gradually until the head is affected. It is one of the most deadly of the vegetable poisons.—Off. Prep. *Extractum Conii.*

CONTRAJERVÆ RADIX. *Root of Contrajerva.*—Dorstenia Contrajerva. *Contrajerva.* Tetrandria Monogynia. *N. O.* Scabridæ, *L.* Urticæ, *J.* South America and the West India islands. Perennial plant.—Prop. Stimulant, sudorific, tonic.—Dose, gr. x. to ℨss. powdered.—Off. Prep. *Pulvis Contrajerva Comp.*

COPAIBA. Copaiba. *Balsam of Copivi.*—Copaifera Officinalis. *Copaiva Tree.* Decandria Monogynia. *N. O.* Dumosæ, *L.* Leguminosæ, *J.* This tree is a native of South America and the West Indies. The *balsam* as it is improperly called (for it contains no benzoic acid) is obtained by boring a hole at the bottom of the tree into the pith, after which it flows very plentifully. It is at first colourless, but becomes yellow by keeping. It is also obtained from other species of the *Copaifera*—Prop. stimulant, diuretic, mildly laxative.—Dose, ♏ x. to ℨss. or more on a lump of sugar or made into an emulsion with yolk of egg. I have observed that in some constitutions its exhibition will excite an itching eruption over the surface of the body. It is chiefly employed in gleets, fluor albus, &c.

CORIANDRI SEMINA. *Coriander Seeds.*—Coriandrum sativum. *Common Coriander.* Pentandria Digynia. *N. O.* Umbellatæ. This annual plant flowers in June, the seeds ripen in August. It was originally a native of Italy, but it has now become indigenous. The virtues of the seeds reside in an essential oil.—PROP. Carminative.—DOSE, ℈j. to ʒj.—OFF. PREP. *Confectio Sennæ.*

CORNUA. *(Hart's) Horn.*—Cervus Elaphus. *The Stag or Hart.* Mammalia Pecora. This animal is a native of Europe, and the North of both Asia and America. It sheds its horns every year in February and March. Horns consist of phosphate of lime, and gelatine. PROP. Nutritious. ℥ iv. of Hartshorn shavings boiled in Oij. of water until the quantity is reduced to half, forms, when strained, sweetened with sugar, and made agreeable to the palate with wine, &c. a useful and nutritious jelly for the sick.—OFF. PREP. *Cornu ustum; Pulvis antimonialis.*

CRETA. *Chalk.*—Found native in England and other countries. Composed of one atom carb. acid, and one atom of lime. [See *Creta præparata.*]

CROCI STIGMATA. *Stigmas of Saffron.*—Crocus Sativus. *Common Saffron.* Triandria Monogynia. *N. O.* Ensatæ, *L.* Irides, *J.* The flower appears in September before the leaves, and is of a violet colour; the stigma is of a deep yellow, and yields an agreeable scent; the root bulbous. Perennial. Indigenous. To collect the stigma the flowers are gathered early in the morning before they are blown. Met with in the shops either in cakes formed by a peculiar process; or in the form of *hay saffron.* It is now employed only on account of the aromatic flavour and beautiful colour, which it imparts to other medicines.—OFF. PREP. *Syrup. Croci; Confectio Aromatica; Pil. Aloes cum Myrrha; Tinct. Aloes comp.; Tinct. Cinchonæ comp.; Tinct. Rhei; Tinct. Rhei, C.*

CUBEBA. *Cubebs*, or *Java Pepper.*—Piper Cubebæ. *Cubebs.* Diandria Trigynia. *N. O.* Piperitæ, *L.* Urticæ, *J.* The plant is a native of Java, Guinea, &c. The berries contain an essential oil, on which their virtues depend, and resinous, and extractive matter, &c.—PROP. diuretic, and slightly aperient.—DOSE, ℈j. to ʒij. mixed with water. Chiefly used in gonorrhœa.

CUMINI SEMINA. *Cumin Seeds.*—Cuminum Cyminum. *Cumin.* Pentandria Digynia. *N. O.* Umbellatæ. This annual plant is a native of Egypt, but the markets in this country are supplied with seeds from Sicily and Malta, where the plant is cultivated. The virtues of the seeds reside in an essential oil.—PROP. Stimulant, antispasmodic.—DOSE, ℈j to ʒj. They are however abandoned as an internal remedy in modern practice. For their external use, see the—OFF. PREP. *Emplastrum Cumini.*

CUPRI SULPHAS. *Sulphate of Copper. Blue Vitriol.*—This salt is procured by evaporating the waters of some copper mines. It is at first formed by the sulphuret of copper of the mine being exposed to air and moisture, which then absorbs oxygen; the sulphur of the sulphuret becomes *sulphuric acid*, and the copper is converted into *peroxide*, which together form the salt in question. In other cases it is procured by roasting the native sulphuret and exposing it to air and moisture, and afterwards resorting to solution and evaporation. It is a bisalt containing two atoms of acid, to one atom of the peroxide.—PROP. Sulphate of copper operates speedily as an emetic, in DOSES of from gr. iij. to gr. x. dissolved in water, and it may be employed in the larger dose in cases of poisoning by laudanum, or other vegetable narcotics. In the smaller dose it is given in the early stages of phthisis, as it does not induce the debility of ordinary emetics. It is also a powerful tonic and astringent in epilepsy, intermittent fever, internal hæmorrhages, &c. in DOSES, of gr. $\frac{1}{4}$. made into pills, which may be increased to gr. j. or gr. ij. Externally it is escharotic. A useful stimulating lotion for pseudosyphilitic sores and indolent ulcers may be made by dissolving gr. iv. in ℥j. of distilled water.—OFF. PREP. *Cuprum ammoniatum.*

CUSPARIÆ CORTEX. *Cusparia Bark,* formerly called *Angustura Bark.*—The college have adopted the name *Cusparia febrifuga,* given by Humboldt to the tree affording this bark, but that assumed by Willdenow is preferable, and has since been received by Humboldt. Bonplandia Trifoliata. *Three-leaved Bonplandia.* Pentandria Monogynia, *N. O.* Rutaceæ, *J.* This elegant evergreen, which is a native of South America, grows in woody situations, and rises to the height of sixty or eighty feet. The bark contains an essential oil.—PROP. Tonic, stomachic.—DOSE, gr. vj. to ℈j. in powder.—OFF. PREP. *Infusum Cuspariæ.*

CYDONIÆ SEMINA. *Quince Seeds.*—Pyrus Cydonia. *The Quince Tree.* Icosandria Pentagynia. *N. O.* Pomaceæ, *L.* Rosaceæ, *J.* Originally from Ceylon in Crete; now found wild in Germany; cultivated in England and on the Continent; flowers in May. Quince seeds are used on account of the mucus they contain, and which they yield to hot water. See the OFF. PREP. *Decoctum Cydoniæ.*

DAUCI RADIX ET SEMINA. *Root and Seeds of Carrot.*—Daucus Carota. *The Carrot.* Pentandria Digynia. *N. O.* Umbellatæ. Indigenous, biennial. Found wild in pastures and on hilly situations. It flowers in June and July. The root of the garden carrot is employed as an emollient and antiseptic in poultices for putrid and ulcerated sores. The seeds of the wild variety are employed. They are stimulant, and diuretic.—DOSE, ℈j. to ʒj. or more bruised. Their virtues reside in an essential oil.

DIGITALIS FOLIA ET SEMINA. *Leaves and Seeds of Foxglove.*—Digitalis purpurea. *Purple Foxglove.* Didynamia Angiosperma. *N. O.* Luridæ, *L.* Scrophulariæ, *J.* An Indigenous biennial plant. Found in gravelly soils by road-sides, and amongst bushes. Flowers in June and July. The virtues of this poisonous plant reside in *Digitalia.*—PROP. Diuretic, cathartic, and a direct sedative.—DOSE. gr. ſs. to gr. iij. in pills. It must be exhibited with caution, and on account of the debility it induces, the patient should be kept in bed when it is taken to any extent for the purpose of producing the full force of its sedative effects. According to Withering it is an useful diuretic in dropsy when the patient is of a lax fibre, having a weak and intermitting pulse, a pale countenance, livid lips, cold skin, soft belly, anasarcous limbs, which easily pit on being pressed; but if the patient be of a robust habit of body, with a hard tense belly, or has, in short, all the symptoms diametrically opposite to the preceding, no good effects are likely to arise from the use of it; therefore previously to administering it to patients of the latter class, it will be necessary to reduce the system by bleeding, and by giving saline and other purgatives. It is observed by Dr. A. T. Thompson, that "Digitalis will not cure a dropsy attended with palsy, unsound viscera, or other complications of disease," and that "no benefit has hitherto been obtained from its use in hydatids, and hydrocephalus." It may be given with advantage as a sedative in phthisis pulmonalis, chronic rheumatism, scrophula, mania, uterine, and other active hæmorrhages, palpitations of the heart, &c. Externally it has been found serviceable, applied to glandular swellings, in the form of fomentation.—OFF. PREP. *Infusum Digitalis; Tinctura Digitalis.*

DOLICHI PUBES. *The hairs of the Dolichos Pods. Cowhage.*—Dolichos pruriens. *Cowhage.* Diadelphia Decandria, *N. O.* Papilionaceæ, *L.* Leguminsoæ, *J.* This climbing plant is a native of America, and the East and West Indies.—PROP. the hairs of the pods act as a mechanical anthelmintic.—DOSE, gr. v. to gr. x. in the morning, mixed with treacle or syrup, and then to be succeeded by a purgative.

DULCAMARÆ CAULIS. *Stalks of Bitter Sweet, or Woody Nightshade.*—Solanum Dulcamara, *Bitter Sweet, &c.* Pentandria Monogynia, *N. O.* Luridæ, *L.* Solaneæ, *J.* Indigenous climbing shrub, grows in hedges; the flowers, which are violet, appear in June and July,

There is an Aus-
-tralian Sort
now used for
asthmatic affections
See Extra Pharm

and are succeeded by berries which ripen in September and October; they are oval, scarlet, full of juice, and are poisonous. The extreme twigs are employed medicinally, and should be collected in August. Their virtues reside in *Solania*.—PROP. Narcotic, diuretic.—DOSE, gr. x. to ʒj. powdered, but it is usually given in the form of the OFF. PREP, *Decoctum Dulcamaræ.*

ELATERII PEPONES. *Fruit of Squirting Cucumber.*—Momordica Elaterium. *Squirting Cucumber.* Monœcia Monadelphia. *N. O.* Cucurbitaceæ. Perennial. South of Europe. The flowers, which are of a pale yellow, appear in June and July. The fruit resembles a small oval cucumber, and is covered with prickles. When ripe it leaves the peduncle, and through the hole at the base it squirts out the seed and juice with great force to some distance. For medicinal purposes the fruit should be gathered in September before it is quite ripe. See the OFF. PREP. *Extractum Elaterii.*

ELEMI. *Resin of Elemi.*—Amyris Elemifera. *The Elemi Tree.* Octandria Monogynia. *N. O.* Terebintaceæ, *J.* Carolina and the Brazils. The resin is procured by making incisions in the bark, and, as it exudes it is left to be dried by the sun.—PROP. Stimulant internally, but now confined to external use; [See OFF. PREP. *Unguentum Elemi C.*

EUPHORBIÆ GUMMI RESINA. *Gum Resin of Euphorbium.*—Euphorbia Officinarum. *Officinal Euphorbium.* Dodecandria Trigynia. *N. O.* Tricoccæ, *L.* Euphorbiæ, *J.* This perennial, shrubby plant, is a native of Africa. The gum resin is obtained by making slight incisions in the branches. It first exudes as a milky juice, which is afforded in very great abundance, and concretes into tears. The fresh juice is corrosive, blistering the skin; and those who collect the gum tie cloths over the face to protect them from the dust of the withered branches which otherwise would excite very violent sneezing.—PROP. Cathartic, emetic, but never used internally on account of its violent effects. Externally, vesicatory. It is sometimes used as an errhine in lethargy,

One kind is used by the bushmen in S. Afr. to poison their
arrows v. Parker Gilmore's "Days & Nights in a desert"
They found it in a spring of water, so that often a water becomes
impregnated that beasts drinking thereof are poisoned. Grass eating
ate it kills, but carnivorous sleep it off however. Gilmore
she has heard of 40 3 oxen out of one herd so getting killed

palsy, amaurosis, &c., but it must be very much diluted with starch to moderate its effects.

FARINA. *Flour*—For the *class* and *order* of wheat see *Amylum*. The proximate elements of flour are principally starch and gluten. It is employed for making poultices, &c.

FERRUM. *Iron.*—This metal is found plentifully throughout the world in combination with oxygen, sulphur, or combined with acids; and it is extracted from its ores by means of heat powerfully applied. It is of no use in medicine in its metallic state; but iron filings are sometimes ordered as a tonic in doses of gr. v. to ʒss.; they are, however, only efficient when they meet with acid in the stomach: See *the preparations of iron* in the Pharmacopœia.

FILICIS RADIX. *Root of Fern.*—Aspidium Filix Mas. *Root of the Male Fern.* Cryptogamia Filicis. *N. O.* Filices. An indigenous, perennial plant, found plentifully in woods and shady places. It flowers in June and July. The inner part of the root is used medicinally.—PROP. Anthelmintic, astringent.—DOSE, ʒj. to ʒiij. mixed with water, and taken in the morning, and a strong aperient afterwards is *said* to remove the tape-worm.

FŒNICULI SEMINA. *Fennel Seeds.*—Anethum Fœniculum. *Sweet Fennel.* Pentandria Digynia *N. O.* Umbellatæ. Biennial plant, native of the South of Europe, but now found wild in this country. It flowers in July and August. The virtues of the seeds reside in an essential oil.—PROP. Carminative.—DOSE, ℈j. to ʒj.—OFF. PREP. *Aqua Fœniculi; Confectio Piperis nigri.*

FUCUS. *Sea Wrack*, or *Bladder Wrack.*—Fucus Vesiculosus. *Bladder Wrack.* Cryptogamia Algæ. *N. O.* Algæ. An indigenous perennial plant found on sea shores, and employed for the manufacture of *kelp*. The virtues of the plant reside in iodine.—PROP. The ashes of the burnt plant, which, together with the above principle, contain carbonate of soda and charcoal, are deobstruent in scrophulous glandular swellings, such as bronchocele. The mucous of the vesicles may be employed externally for the same purpose.—DOSE, ℈j. to ʒj. of the ashes.

GALBANI GUMMI-RESINA. *Gum-resin of Galbanum.*—Bubon Galbanum. *Lovage-leaved Bubon.* Pentandria Digynia. *N. O.* Umbellatæ. This perennial plant is found near the Cape of Good Hope and Syria. The gum resin is procured by wounding, or cutting the stem off, a little above the root. It first exudes as a cream-like juice, but soon concretes, and is then collected. It is gum resin combined with extractive matter and volatile oil.—PROP. Antispasmodic, stimulating expectorant, emmenagogue.—DOSE, gr. x. to ʒss. in pills. Externally resolvent.—OFF. PREP. *Pil. Galbani C.; Emplastrum Galbani C.*

GALLÆ. *Galls.*—The galls of the shops are the produce of the *Quercus Infectoria* by means of an insect, the *Cynips Quercus folii* of Linnæus. Quercus infectoria. *Dyer's Oak.* Monœcia Polyandria. *N. O.* Amentaceæ. This species of oak is a native of Asia Minor; it is a shrubby tree, not growing higher than about six feet. The gall is produced by the insect wounding the tree with its sting where the shoots of the young boughs commence, and it then deposits its egg in the wound; the morbid secretion envelopes the egg in a short time, and the irritation is kept up by the egg increasing in size along with the excrescence. The galls should be gathered before the larva they contain changes to the fly which would eat its way out. It is from this circumstance that we sometimes see the galls perforated, and they are then of a lighter colour and not so good as those which have been collected at the right time, in which case they are of a bluish or blackish-green. The virtues of galls reside in *tannin* and *gallic acid*, together with which they contain a volatile oil and a peculiar acid, termed *ellagic.*—PROP. Powerfully astringent, but seldom exhibited internally, being chiefly employed in infusion for gargles and injections; and in the state of powder, united with lard, they form a useful dressing for blind piles.—DOSE, internally gr. x. to ℈j.

GENTIANÆ RADIX *Root of Gentian.*—Gentiana Lutea. *Yellow Gentian.* Pentandria Digynia, *N. O.* Rosaceæ.

L. Gentianæ, *J.* This perennial plant grows on the Alps, the Apennines, the Pyrennees, and in North America. The virtues of gentian reside in extractive, which contains a bitter principle termed *gentianine.*—PROP. This root is an useful tonic, and stomachic.- DOSE, gr. x. to ℈ij. powdered, but seldom exhibited in this form.—OFF. PREP. *Extractum Gentianæ ; Infusum Gentianæ C. ; Tinctura Gentianæ C.*

GLYCYRRHIZÆ RADIX. *Liquorice Root.*—Glycyrrhiza glabra. *Common Liquorice.* Diadelphia Decandria. *N. O.* Papilionaceæ, *L.* Leguminosæ, *J.*—Syria and the South of Europe, but cultivated plentifully in this country. It flowers in August, and the roots are dug up for use in November, when the plant is three years old. The root abounds in saccharine matter and mucus.—PROP. Demulcent, but seldom given in substance.—OFF. PREP. *Extractum Glycyrrhizæ ; Decoctum Sarsaparillæ C. ; Infusum Lini ; Confectio Sennæ ; Pil. Hydrargyri.*

GRANATI CORTEX. *Bark of the Pomegranate.*—Punica Granatum. *Pomegranate Tree.* Icosandria Monogynia. *N. O.* Pomaceæ, *L.* Myrtæ, *J.* South of Europe, Barbary, and Asia; but is said to thrive better in the West Indies, than in those countries of which it is originally a native. The bark of the root and fruit contains *tannin and gallic acid.*—PROP. Astringent, anthelmintic.—DOSE, ℈j. to ʒj. in powder, or a decoction made with ℥jss. of the bark to Oj of water, of which ℥j. may be given four times a day, is said to effectually eradicate the tape-worm.

GUAIACI RESINA ET LIGNUM. *Resin and Wood of Guaiacum.*—Guaiacum officinale. *Officinal Guaiacum.* Decandria Monogynia. *N. O.* Gruinales, *L.* Rutaceæ, *J.* West Indies, and the warmer climates of America. The whole tree is medicinal. The gum is a natural exudation, but it is also obtained artificially by wounding the tree, after which the juice flows abundantly and is hardened by the sun. It is likewise obtained by other processes. The exudation is neither gum nor resin but a substance *sui generis.*—PROP. The wood and resin are diuretic, diaphoretic, stimulant, aperient.—

Dose, of the resin gr. x. to ʒss. in the form of pills, or emulsion. Guaiacum was originally employed as a cure for syphilis: it is now only employed after mercury in that disease. It is serviceable in chronic rheumatism, some cutaneous affections, &c.—Off. Prep. The wood enters into *Decoctum Sarsaparillæ C.* The resin into *Mistura Guaiaci; Tinctura Guaiaci; Tinctura Guaiaci Ammoniata; Pulvis Aloes C.*

HÆMATOXYLI LIGNUM. *Logwood.*—Hæmatoxylon campechianum. *The Logwood Tree.* Decandria Monogynia. *N. O.* Lomentaceæ, *L.* Leguminosæ, *J.* South America. Logwood according to Chevreul, contains an essential oil, tannin, colouring matter, acetates of lime and potash, and a peculiar principle termed *hæmatin*—Prop. Astringent.—Off. Prep. *Extractum Hæmatoxyli.*

HELENIUM. *Elecampane.*—Inula Helenium. *Elecampane.* Syngenesia Superflua. *N. O.* Compositæ discoideæ, *L.* Corymbiferæ, *J.* An indigenous perennial plant. The flowers appear in July and August, and are of a golden colour.—Prop. The root is said to be tonic, diuretic, and expectorant; but its properties are doubtful.—Dose, ℈j. to ʒj. powdered.—Off. Prep. *Confectio Piperis nigri.*

HELLEBORUS. *Hellebore.* Polyandria Polygynia. *N. O.* Multisiliquæ, *L.* Ranunculaceæ, *J.*

Helleborus fœtidus. *Stinking Hellebore.*

Helleborus niger. *Black Hellebore.*

HELLEBORI FŒTIDI FOLIA. *Leaves of Stinking Hellebore.*—The former of the above named species is an indigenous perennial plant, and flowers in March and April.—Prop. The leaves are powerfully cathartic and emetic.—Dose, grs. vj. to ℈j. powdered. They are said to be efficient in exterminating the *lumbricus teres.*

HELLEBORI NIGRI RADIX. *Root of Black Hellebore.*—The latter of the above named species is a native of Austria and Italy. It is cultivated in our gardens, and flowers from December to March, and is called the

Christmas Rose.—PROP. Drastic hydragogue cathartic, emmenagogue, alterative.—DOSE, gr. iij. to ℈j., but the dose must be regulated by the nature of the complaint it is intended to relieve, large doses only being serviceable as a purgative. It is, however, seldom given in substance.—OFF. PREP. *Tinctura Hellebori nigri.*

HORDEI SEMINA. *Pearl Barley.*—Hordeum distichon. *Common Barley.* Triandria Digynia. *N. O.* Gramineæ. It is not known of what country barley is originally a native. It consists of starch in abundance, a little gluten, saccharine matter, and mucilage.—OFF. PREP. *Decoctum Hordei ; Decoctum Hordei comp.*

HUMULI STROBILI. *Hops.*—Humulus Lupulus. *The Hop.* Diœcia Pentandria. *N. O.* Scabridæ, *L.* Urticæ, *J.* An indigenous, perennial plant found in hedges: the strobiles appear in July, but the plant is cultivated for the purposes to which the strobiles are applied. The active principle of hops resides in *Lupulin ;* a substance which may be separated by sifting them in a fine sieve. This substance, however, has not, as yet, been obtained in a pure state.—PROP. Tonic, diuretic, anodyne, sedative.—DOSE, in powder, gr. v. to ʒss., but the *Pharmacopœial* preparations are preferable. Externally, hops are anodyne and discutient in form of fomentation, and a pillow made of them is said to induce sleep in maniacal cases. *Extract. Humuli ; Tinct. Humuli.*

HYDRARGYRUM. *Mercury. Quicksilver.*—This metal is found native in several countries, but it more usually occurs in combination with sulphur, in which state it is called *Cinnabar.* To obtain the metal this ore is heated with lime or iron filings, by which means the mercury distils over, and the sulphur is retained by the lime, or iron. Mercury is fluid at the ordinary temperature of the atmosphere, and its sp. gr. is about 13. ; but it becomes solid, malleable, and heavier at 40° below Zero, Fahrt. its sp. gr. being increased to more than 15. It boils, and may be distilled like water, at about 680° Fahrt. Mercury exerts no action on the animal economy in its metallic state. It has, however, been ordered, on account of its density in certain obstructions of the bowels, in doses exceeding a pound in weight; but it is difficult to conceive the utility of this mode of exhibiting it, when we consider the ascending position of some parts of the intestinal canal. See the *Preparations of mercury* in the *Pharmacopœia* for its medicinal use.

HYOSCYAMI FOLIA ET SEMINA. *Leaves and Seeds of Henbane.* Hyoscyamus niger. *Common Henbane.* Pentandria Monogynia. *N. O.* Luridæ, *L.* Solaneæ, *J.* This is an indigenous annual plant, growing on the sides of roads, &c. and flowering in July. Poisonous. The virtues of henbane as well as its poisonous qualities reside in *hyoscyama.*—PROP. Narcotic, diaphoretic, anodyne. It is chiefly employed in those cases where opium is inadmissible from its either constipating the bowels, or affecting the head, or in any other way not agreeing with the patient.—DOSE, gr. iij. to gr. x. but it is best administered under the form of the OFF. PREP. *Extractum Hyoscyami ; Tinctura Hyoscyami.*

JALAPÆ RADIX. *Root of Jalap.*—Convolvulus Jalapa. *Jalap.* Pentandria Monogynia. *N. O.* Campanaceæ, *L.* Convolvuli, *J.* The Jalap plant is a native perennial of South America, and its name is derived from Xalappa, a city in Mexico.—PROP. The root is a very useful and active hydragogue cathartic.—DOSE, gr. x. to ℨss. powdered. It is apt to gripe, and therefore may be conjoined with any convenient corrigent.—OFF. PREP. *Ext. Jalapæ ; Tinct. Jalapæ.*

IPECACUANHÆ RADIX. *Root of Ipecacuanha.*—Calicocca or Cephaëlis Ipecacuanha. *Ipecacuan.* Pentandria Monogynia. *N. O.* Aggregatæ, *L.* Rubiaceæ, *J.* This perennial plant is a native of the Brazils, and is found in forests. The virtues of the root reside in a peculiar principle termed *emetine.*—PROP. Emetic, in DOSES of gr. xv. to ℨss. powdered. It is sudorific and expectorant in DOSES of gr. ss. to gr. ij. And in small doses it may be conjoined with cathartics to facilitate their action.—OFF. PREP. *Pulvis Ipecacuanhæ C.; Vinum Ipecacuanhæ.*

JUNIPERI BACCÆ ET CACUMINA. *Berries and tops of Juniper.*—Juniperus communis. *Common Juniper.* Diœcia Monadelphia. *N. O.* Coniferæ. This is an indigenous, evergreen shrub, and is found on heaths; it flowers in May, and the berries remain on the tree two years before they are completely ripened. The markets are chiefly supplied with the berries from Holland, Germany, and Italy. The virtues of the berries and tops reside in an essential oil, which is also found in the more woody part of the plant.—PROP. Diuretic, stomachic.—The berries are not conveniently exhibited in substance. A strong infusion may be made of the bruised berries or tops, and may be taken almost ad libitum.—OFF. PREP. *Oleum Juniperi; Spiritus Juniperi C.*

KINO. *Kino.*—Pterocarpus Erinacea. Diadelphia Decandria. *N. O.* Papilionaceæ. This tree is a native of Senegal. There are several other trees which produce *kino.* It is observed by Dr. A. T. Thomson, that "the *kino* now found in the shops comes from India, and is the extract of the *nauclea gambir.* The branches and twigs are bruised and boiled in water. The decoction is then evaporated until it acquires the consistence of an extract which is kino." The astringent quality of the several sorts of kino resides in tannin; but gallic acid is not present.—PROP. Strongly astringent. Externally, astringent, styptic.—DOSE, gr. x. to ʒss.—OFF. PREP. *Tinctura Kino; Pulvis Kino C.*

KRAMERIÆ RADIX. *Rhatany Root.*—Krameria Triandra. *Triandrous Krameria.* Tetrandria Monogynia. *N. O.* Rosaceæ. This shrub is a native of Peru. The astringency of the root resides in tannin, and there is a trace of gallic acid.—PROP. Strongly astringent. Externally, astringent, styptic.—DOSE, gr. x. to ʒss. powdered. It may also be exhibited in the form of infusion and tincture.

LACTUCA. *Lettuce.*—Lactuca sativa. *Garden Lettuce.*

Syngenesia æqualis. *N. O.* Compositæ semiflosculosæ, *L.* Cichoraceæ, *J.* Europe. A peculiar substance called *lactucarium* is procured from the lettuce by cutting off the stem about a foot from the ground. It exudes as a milky juice, and becomes darker by inspissation. When the juice ceases to flow from the surface of the wound, the stem must be again cut across, and so on. The juice may be collected by means of a sponge, and is then to be squeezed out and inspissated. The narcotic principle of lactucarium has been supposed to reside in *morphia*, but it appears to be questionable.—PROP. Narcotic. Lactucarium may be used in those cases where opium, from a variety of causes, cannot be exhibited.—DOSE, gr. j. to gr. vj. in form of pill.—The leaves of lettuce are employed in the OFF. PREP. *Extractum Lactucæ.*

LAVANDULÆ FLORES. *Flowers of Lavender.*—Lavandula Spica. *Lavender.* Didynamia Gymnospermia. *N. O.* Verticillatæ. This shrub is a native of the south of Europe, but is now common in our gardens. The flowers, which appear from June to September, should be collected in dry weather. Their odour resides in an essential oil.—PROP. Stimulant; but never given in substance.—OFF. PREP. *Oleum Lavandulæ; Spiritus Lavandulæ; Spiritus Lavandulæ comp.*

LAURI BACCÆ ET FOLIA. *Berries and Leaves of the Bay Tree.*—Laurus nobilis. *Common sweet Bay.* Enneandria Monogynia. *N. O.* Oleraceæ, *L.* Lauri, *J.* It is an evergreen, and is cultivated in gardens in this country, and flowers in April and May. In Italy and those countries in the south of Europe of which it is a native, it grows to the height of thirty feet. The poisonous properties of the water which comes over by distilling the leaves, and of the essential oil which the berries afford by boiling in water, are owing to hydrocyanic acid. The berries yield an oil by expression which is tasteless.—PROP. The berries and leaves are narcotic, and sedative, but are laid aside in modern practice.—DOSE, in substance, gr. x. to ʒss.

LICHEN. *Iceland Moss.*—Lichen Islandicus. *Iceland Moss* or *Liverwort.* Cryptogamia Algæ. *N. O.* Algæ.

Indigenous. Perennial.—Prop. Demulcent, nutritive, tonic. It is used as an article of food in Lapland and other northern countries, after being deprived of its bitterness by macerating it in water. The Off. Prep. *Decoctum Lichenis* is the form in which it is exhibited medicinally.

LIMONES. *Lemons.*—Citrus Medica. *The Lemon-tree.* Polyadelphia Icosandria. *N. O.* Pomaceæ, *L.* Aurantiæ *J.* Native of Assyria and Persia, but now cultivated in the south of Europe and other parts of the globe. Lemon juice contains more citric acid, and a smaller quantity of saccharine matter than orange juice.—Prop. The juice is refrigerant, and antiscorbutic, and may be given as a drink in febrile diseases under the form of lemonade. It may also be used in forming effervescent draughts by adding f℥ss. to ℈j. of powdered carbonate of potash. The crystallized citric acid may be substituted for the juice.—Off. Prep. *Acid. citricum ; Syrupus Limonis.*

LIMONUM CORTEX. *Rind of Lemons.*—The virtues of the rind reside in an essential oil.—Prop. Stomachic, tonic. Used as an adjunct in the Off. Prep. *Infusum Aurantii C. ; Infusum Gentianæ C.; Spiritus Ammoniæ aromaticus.*

LIMONUM OLEUM. *Oil of Lemons.*—The essential oil of the rind of lemons may be obtained both by distillation and expression. See the last article. Used as a perfume in the Off. Prep. *Unguentum Veratri.*

LINUM CATHARTICUM. *Purging Flax.*—Pentandria Pentagynia. *N. O.* Gruinales, *L.* Caryophylleæ, *J.* An indigenous, annual plant, bearing white flowers, which appear from June to August.—Prop. Purgative.—Dose, ʒj. of the dried plant, powdered. It may also be exhibited in the form of infusion. Seldom employed.

LINI USITATISSIMI SEMINA. *Common Linseed.*—Linum Usitatissimum. *Common Flax.* Pentandria Pentagynia. *N. O.* Gruinales, *L.* Caryophylleæ, *J.* Supposed to be originally a native of Egypt, but now cultivated plentifully throughout Europe. Annual.

The flowers are sky blue ; they appear in June and July, and the seeds ripen in September. The seeds contain mucus, and a fixed oil.—PROP. Emollient, demulcent. See the OFF. PREP. *Infusum Lini C.* ; *Oleum Lini.* The meal obtained by grinding the seeds forms an useful poultice in a variety of cases.

MAGNESIÆ SUBCARBONAS. — *Subcarbonate of Magnesia.* — This salt is now prepared on an extensive scale from *bittern*, which is the liquor that remains after the crystallization of common salt from sea water, and which is principally a solution of muriate of magnesia. This solution is heated to the boiling point, and then either impure subcarbonate of potash, or subcarbonate of ammonia is added to it ; the whole is well stirred and then the fire is taken off. Double decomposition ensues, giving rise to subcarbonate of magnesia, which is insoluble, and either muriate of potash, or muriate of ammonia is held in solution, which is drawn off, and the subcarbonate of magnesia is washed and dried. It is sometimes met with in the market in square lumps, which often contain chalk or gypsum. The College has given a formula for preparing this salt. See the *Pharmacopœia.*

MAGNESIÆ SULPHAS. *Sulphate of Magnesia.*— This salt is found native in a crystallized state. It is more plentifully met with in combination with sulphate of lime and other salts. It is also contained in several mineral springs, and in sea water. It was first procured in England in 1675, by evaporating the water of a spring, at Epsom, and hence it was called *Epsom salt.* It is now procured in a cheaper and more plentiful manner from *bittern*, which is the liquor remaining after the crystallization of common salt from sea water. Sulphate of magnesia obtained from bittern is deliquescent on account of its being combined wlth muriate of magnesia. Dr. Henry has devised a method of procuring sulphate of magnesia from the magnesian limestone : it is preferable to that obtained from bittern, on account of its not containing any muriate of magnesia.—PROP. Purgative, and diuretic. It ought to be given plentifully diluted with water. Infusion of roses is an excellent vehicle for its exhibition.—DOSE, ʒj. to ℥j. It may also be exhibited in the form of glyster.

MALVA. *Common Mallow.*—Malva sylvestris. *The common Mallow.* Monadelphia Polyandria. *N. O.* Columniferæ, *L.* Malvaceæ, *J.* Perennial. Indigenous. Grows in waste places, and by road-sides. Flowers from May to August. See OFF. PREP. *Decoctum Malvæ C.*

MANNA. *Manna.*—Fraxinus ornus. *Flowering Ash.* Polygamia Diœcia. *N. O.* Sepiariæ, *L.* Jasmineæ, *J.* south of Europe. Cultivated in England, and flowers in May and June. Manna is produced from two other species of ash, the *F. rotundifolia*, and *F. excelsior*. It is a natural exudation from the tree, and is produced in warm dry weather. It concretes in tears, which are scraped off, and sold under the name of *manna in the tear*. The greater part of manna, however, is obtained from the tree by incisions; this is called *manna grassa*, fat manna. It is sometimes collected on straws and chips as it exudes, and is then of a finer quality, and is called *flaky manna*. Manna consists, according to Thénard, of mannite, a crystallizable saccharine principle, a small proportion of pure sugar, and a nauseous uncrystallizable mucus on which its active properties depend.—PROP. Gently laxative. It is apt to gripe, and is therefore generally given in combination with other aperients, such as the neutral salts, senna, &c.—DOSE, ℥j. to ℥ij.—OFF. PREP. *Confectio Cassiæ.*

MARMOR ALBUM. *White Marble.*—The purest marble is that from Carrara, in Italy. Marble is a *variety* of limestone, being composed of carbonic acid and lime. It differs from chalk and common limestone in its compactness, and in containing its elements less mixed with impurities. It is introduced in the *Mat. Med.* for obtaining lime, and carbonic acid. See the OFF. PREP. *Sodæ Carbonas; Potassæ Carbonas; Calx.*

MARRUBIUM. *Horehound.* — Marrubium vulgare. *White Horehound.* Didynamia Gymnospermia. *N. O.*

Verticillatæ, *L.* Labiatæ, *J.* Indigenous. Perennial. This plant grows in waste places, and flowers in July. Its active principles are said to be an essential oil, bitter extractive, and gallic acid.—PROP. Tonic, diuretic, laxative.—DOSE, ʒss. to ʒj. of the dried herb powdered; or f℥ss. to f℥jss. of the expressed juice of the fresh plant. It may likewise be given under the form of infusion. It is chiefly confined to pulmonary affections.

MASTICHE. *Mastich.*—Pistacia Lentiscus. *Mastich-tree.* Diœcia Pèntandria. *N. O.* Amentaceæ, *L.* Terebintaceæ, *J.* This tree is a native of the Levant. The male and female flowers are on distinct trees. The mastich is obtained by making transverse incisions into the trunk and branches of the tree. It exudes slowly; part of it drops on the ground, which is made ready to receive it, and the other part remains on the tree, from which it is detached with a sharp iron instrument.—PROP. Diuretic, stimulant. But its virtues are very doubtful, and it is now seldom employed medicinally.

MEL. *Honey.*—This substance is collected by the bee from the nectaries of flowers; but it is supposed to undergo some change in the insect, before it is deposited in the honey-comb. As honey is designed for the food of the bee during the winter, this change cannot be considered as the effect of digestion. The flavour of honey varies according to the flowers from which it has been collected. It is separated from the comb by dripping and by expression: the former mode affords the purest honey. *Virgin honey* is that which is obtained from young hives which have never swarmed.—PROP. Laxative. Used locally as a detergent for foul ulcers, and apthous affections of the mouth, &c. It is chiefly employed for internal exhibition as an adjunct or vehicle for other medicines. It is a wholesome and nutritious article of food, but is apt to gripe if eaten in excess.—OFF. PREP. See *Mellita* in the *Pharmacopœia.*

MENTHA PIPERITA. *Peppermint.*—Didynamia Gymnospermia. *N. O.* Verticillatæ, *L.* Labiatæ, *J.* Indigenous, perennial; found in damp situations. Flowers in August and September. It is cultivated for the purposes of medicine. The virtues of the plant reside in an essential oil, and camphor.—PROP. Antispasmodic, carminative, tonic. It may be given in infusion. It is an useful adjunct to other medicines, and is generally employed under the form of the OFF. PREP. *Oleum Menthæ Piperitæ; Aqua Menthæ Piperitæ; Spiritus Menthæ Piperitæ.*

MENTHA VIRIDIS. *Spearmint.*—For *class* and *order* see *Mentha piperita.* Indigenous, perennial plant, found in marshy situations, and flowers in August. It is cultivated for the purposes of medicine. Its virtues reside in an essential oil.—PROP. Stomachic, carminative. It may be given in infusion, or under the form of the OFF. PREP. *Aqua Menthæ Viridis; Oleum Menthæ Viridis; Spiritus Menthæ Viridis.*

MEYNYANTHES. *Buckbean.*—Meynyanthes trifoliata. *Buckbean.* Pentandria Monogynia. *N. O.* Preciæ, *L.* Lysymachiæ, *J.* A very beautiful, indigenous, perennial plant, growing in moist places, and flowering in June and July.—PROP. Tonic, aperient, diuretic.—DOSE. ℈j. to ʒj. of the dried leaves, powdered. Or it may be given under the form of infusion, made in the proportion of ℥ſs. of the dried leaves to half a pint of water: f℥j. or more is a dose. It is apt to excite vomiting when given in too large a quantity. It should be conjoined with some aromatic.

MEZEREI CORTEX. *Bark of Mezereon.*—Daphne Mezereum. *Common Mezeron.* Octandria Monogynia. *N. O.* Vepreculæ, *L.* Thymelææ, *J.* Found wild in England and the north of Europe; but for ornamental and medical purposes it is cultivated. Its flowers appear in March before the leaves. The berries are red and pulpy, each containing one seed, and are poisonous. Vauquelin has obtained from the inner bark a peculiar crystalline principle, which he calls *daphnin.* The bark of the root is ordered by the College, but that of the whole plant is equally serviceable. It excites a very acrid, disagreeable, and permanent sensation when chewed, and it occasions inflammation and vesication when applied to the skin.—PROP. Stimulating diaphoretic, and alterative.—DOSE, in substance, gr. j. to gr. x. It is, however, more commonly given under the form of the OFF. PREP. *Decoctum Sarsaparillæ C.*

MORI BACCÆ. *Mulberries.*—Morus Nigra. *Common Mulberry-tree.* Monœcia Tetrandria. *N. O.* Scabridæ, *L.* Urticæ, *J.* Native of Persia. It is cultivated throughout Europe. It flowers in June, and the fruit ripens in September. The acidulous quality of mulberries resides in tartaric acid.—PROP. Mulberries are aperient and cooling, and are considered wholesome if not eaten in too large a quantity. For their medicinal use, see the OFF. PREP. *Syrupus Mori.*

MOSCHUS. *Musk.*—Moschus Moschiferus. *The Musk Deer.* Mammalia Pecora. This is a solitary animal, inhabiting the mountainous districts of eastern Asia. When full grown it is not more than three feet in length. The musk bag is situated between the navel and prepuce. It is empty while the animal is young, but in the adult state it contains from ʒiss. to ʒij. of musk, which is in a liquid state. The bag is usually cut from the animal whilst it is alive, as the musk is supposed to be partially absorbed if it be killed. On account of the high price of musk it is very much adulterated, and for the same reason is not often employed medicinally.—PROP. Musk is one of the most powerful of the antispasmodics.—DOSE, gr. vj. to ʒj. in the form of bolus.—OFF. PREP. *Mistura Moschi.*

MYRISTICÆ NUCLEI. *Nutmegs, (and their expressed oil.)* Myristica Moschata. *The Nutmeg-tree.* Diœcia Monadelphia. *N. O.* Lauri, *J.* Native of the Molucca Islands; but now cultivated at Banda, and at Bencoolen, in the island of Sumatra, whence the European markets are supplied. The fruit is fleshy, smooth, one-celled, and about the size of a small peach. The fleshy part dries up and becomes a coriaceous crust, which opening on one side discloses the nutmeg in its shell, surrounded with an arillus, which is the *mace* of the shops. Although the fruit requires nine months to ripen, yet the tree bears three crops within the year, and it is fruitful from the seventh to the eightieth year. Nutmegs contain an essential oil, a fixed oil, together with starch, gum, and wax.—PROP. Stimulant, carminative, and in large doses narcotic.—DOSE, in substance, grated, gr. v. to ℈j. Of the oil ♏ ij. to ♏ vj.—OFF. PREP. *Spiritus Myristicæ.*

MYRRHA. *Myrrh.*—This substance, from its appearance, is supposed to be the natural exudation of a tree, which has not yet been described. Myrrh is brought from Abyssinia and Arabia Felix. It ranks with the gum-resins.—PROP. Tonic, expectorant. It ought not to be exhibited in pulmonary affections accompanied with active inflammation, on account of its stimulating effects. It is employed externally as a local stimulant for ill-conditioned ulcers, and is used in the form of gargle, with advantage, in cynanche maligna, &c.—DOSE, in substance, gr. x. to ʒss.—OFF. PREP. *Tinctura Myrrhæ; Mistura Ferri C.; Pilulæ Aloes cum Myrrha; Pilulæ Ferri cum Myrrha; Pil. Galbani C.*

OLIBANUM. *Olibanum.*—The *Juniperus Lycia* on the authority of Linnæus, was supposed to produce olibanum; but from more recent researches, it appears to be the produce of the *Boswellia serrata* of Roxburgh. *Decandria Monogynia.* N. O. *Terebintaceæ.* This tree is a native of the Indian mountains.—PROP. The gum-resin is stimulant, and diaphoretic; but it is now rarely employed medicinally.

OLIVÆ OLEUM. *Oil of Olives*—Olea Europæa. *European Olive.* Diandria Monogynia. *N. O.* Sepiariæ, *L.* Jasmineæ, *J.* Native of the south of Europe, and north of Africa, but cultivated in the Greek islands, and in France, Spain, and Italy. There are several varieties of the olive tree. The oil is procured from the pulp surrounding the nut, by the following process: as soon as the olives are gathered they are bruised in a mill, the stones of which are so arranged as not to crush the nut. The pulp is then put into bags made of rushes and subjected to the press: the best oil flows first, and is called *virgin oil*; and by a second and third process, oil of an inferior quality is obtained. Olive oil is the lightest of the fixed oils.—PROP. Demulcent, aperient.—DOSE, fʒj. to f℥j. formed into an emulsion. When applied externally it is relaxant. It is a good vehicle for opium and other active medicines in forming liniments. It also enters into the composition of ointments, plasters, cerates, &c. and is often an useful adjunct to glysters.

OPIUM. *Opium.*—Papaver Somniferum. *The White Poppy.* Polyandria Monogynia. *N. O.* Rhœdææ, *L.* Papaveraceæ, *J.* Native of Asia. It is an annual, and is cultivated in this and other countries. In Europe it flowers in June and July: in eastern countries in February. Excepting the seeds, the whole plant contains a milky juice, which is most abundant in the capsules. The manner of procuring and collecting opium in India and Persia consists in making longitudinal incisions from below upwards, in the half-ripe capsule, with a sharp five-pointed instrument. The incisions do not perforate the capsule. This process is resorted to in the evening. The dew during the night assists the exudation of the juice, which is collected in the morning with a small iron scoop. It is then put into an earthen pot, and worked in the sunshine with wooden spatulas until it has become of considerable consistence; after which it is formed into balls, which are dried in earthen basins, and then covered with the leaves of poppy or tobacco. The markets are supplied with opium from India and Turkey, but the Turkey opium is brought originally from Persia. The Indian opium is in round masses and covered to a considerable thickness with the petals of the poppy. The best Turkey opium is in flat pieces, covered with leaves and the red capsules of a species of *Rumex,* which are wanting in the inferior sorts of opium. As opium is liable to be adulterated with a variety of impurities, great care ought to be taken in the selection of it for medical use. The sedative virtues of opium reside in *morphia,* an alkali which is combined with *meconic acid;* the stimulating properties reside in a vegetable principle termed *narcotine.* The meconic acid exerts no action on the animal economy. The manner of obtaining these substances is explained under the head *vegetables* in the Pharmacopœia. —Prop. Stimulant, sedative, narcotic, anodyne.—Dose, gr. ss. to gr. iv.; but the dose must always be proportioned to the nature of the complaint, and the intention for which it is exhibited must be borne in mind. Indeed, no medicine in the whole range of materia medica requires more care in its exhibition than opium, and as it enters into a variety of Pharmaceutical preparations, the practitioner ought always to remember the exact quantity in each, so as to be able to prescribe them with safety.*—Off. Prep. *Confectio Opii; Extractum Opii; Pilulæ Saponis cum Opio; Pulvis Cornu usti cum Opio; Pulvis Cretæ C. cum Opio; Pulvis Ipecacuanhæ C.; Pulvis Kino C.; Tinctura Opii; Tinctura Camphoræ C.; Vinum Opii; Emplastrum Opii.*

OPOPANACIS GUMMI - RESINA. *Gum-resin of Opopanax.*—Pastinaca Opopanax. *Opopanax, or Rough Parsnip.* Pentandria Digynia. *N. O.* Umbellatæ. This perennial plant is a native of the south of Europe, flowering in July. The root is thick and branched. The gum-resin is obtained by making incisions in the root: it flows at first as a milky juice, and becomes hard in the sun. Prop. Antispasmodic, emmenagogue.—Dose, gr. x. to ℨss.

ORIGANUM *Marjoram.*—Origanum Vulgare. *Common Marjoram.* Didynamia Gymnospermia. *N. O.* Verticillatæ, *L.* Labiatæ, *J.* Indigenous. Perennial. Flowers from July to September. The virtues of the plant reside in a volatile oil.—Prop. Stomachic, tonic, emmenagogue.—Dose, gr. x. to ℈j. of the dried plant, powdered.—Off. Prep. *Oleum Origani.*

OVUM. *The Egg.*—Phasianus Gallus. *The Dunghill Fowl.* Aves, Gallinæ.—Use. The yolk of egg is a pharmaceutical agent, for uniting oils, &c. with water in the formation of emulsions; and the white is employed in some cases of clarification. Egg-shells are composed of carbonate of lime, phosphate of lime, and animal matter.

PAPAVERIS CAPSULÆ. *Capsules of the White Poppy.*—For *class* and *order* see Opium.—The capsules of the white poppy are collected and dried for medicinal purposes. For their use, see the Off. Prep. *Decoctum Papaveris; Extractum Papaveris; Syrupus Papaveris.*

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* See the Table at the end of the *Pharmacopœia.*

PETROLEUM. *Petroleum, Mineral Tar, Naphtha, Bitumen,* or *Barbadoes Tar.* This substance is found in several parts of the world, in different states of purity. The purest kind is termed *naphtha.* It flows out of Monte Ciaro, in Italy, and the mountains of Bucktiavi, and is received in pits containing water, from the surface of which it is skimmed. It consists of hydrogen and carbon, and from its containing no oxygen, is a useful liquid for preserving the metals *potassium, sodium,* &c. Petroleum of less purity is met with in other places.—PROP. Antispasmodic, diaphoretic.—DOSE, ♏x. to f℥ss., but it is now very seldom used medicinally.

PIMENTÆ BACCÆ. *Pimenta Berries. Allspice.*—Myrtus Pimenta. *Pimenta,* or *Allspice-tree.* Icosandria Monogynia. *N. O.* Hesperideæ, *L.* Myrti, *J.* Native of South America and the West India islands. The green unripe berries are gathered and exposed to the sun for some days, spread thin upon cloths, being kept from dew, and frequently turned until they become dry. The smallest berries are considered the best. Their properties reside in a volatile oil, which is heavier than water.—PROP. Aromatic, stimulant, tonic. They are useful as a corrigent for griping and disagreeably-tasting medicines. —DOSE, gr. v. to ℈ij. in substance; but a more convenient mode of exhibition is found in the OFF. PREP. *Aqua Pimentæ; Oleum Pimentæ.* The berries also enter into *Syrupus Rhamni.*

PIPERIS LONGI FRUCTUS. *Fruit of Long Pepper.* —Piper longum. *Long Pepper.* Diandria Trigynia. *N. O.* Piperitæ, *L.* Urticæ, *J.* This perennial plant is a native of Malabar and Bengal. The fruit being hottest in its unripe state, is gathered whilst green, and dried in the sun. It yields *piperin,* a concrete fatty substance which is the cause of its pungency, a little volatile oil, extractive and gummy matter, starch, bassorine in abundance, and some saline ingredients.—PROP. Stimulant, aromatic.—DOSE, gr. v. to ℈j.—OFF. PREP. *Confectio Opii; Pulvis Cinnamomi C.; Pulvis Cretæ C.*

PIPERIS NIGRI BACCÆ. *Berries of Black Pepper.*

—For *class* and *order* see *Piper longum.* East Indies. A climbing plant. The vines in Sumatra are propagated by cuttings or suckers, and are supported by props. They do not bear till three years old, but from that time they continue bearing for eight years. The berries are gathered as they ripen, and are spread upon mats to dry. The vines yield two crops within the year: the first in September, the second in March. *White pepper* is the ripe berries deprived of their outer coat by a preparation of lime and mustard oil. Black pepper affords *piperin*, a concrete oil on which its acrimony depends, a volatile oil, gummy and extractive matter, malic and tartaric acids, starch, lignin, and earthy and alkaline salts.—PROP. Stimulant, aromatic.—DOSE, gr. v. to ℈j.—OFF. PREP. *Confectio Piperis nigri.*

PIX ABIETINA. *Burgundy Pitch.*—See *Pinus Abies.* Obtained by making incisions through the bark, and laying bare the wood. It exudes and concretes in flakes, which are removed with an iron instrument. It is then put into large boilers with water, and when melted it is strained through coarse cloths by means of a press. It is chiefly collected at Neufchatel.—USE. It is employed externally as a rubefacient in form of plaster.—OFF. PREP. *Emplastrum Picis C.*

PIX LIQUIDA. *Tar.*—Pinus sylvestris. *The Wild Pine. Scotch Fir.* Monœcia Monadelphia. *N. O.* Coniferæ, *J.* Found on the Scotch mountains, and throughout the north of Europe. Besides *tar*, *turpentine* and *yellow resin*, are derived from this tree. The manner of procuring tar is as follows: the branches and roots of the trees being cut into billets, are piled up in stacks and covered with turf. They are then set on fire, and burn with a smothering flame. The resinous part of the wood is thus decomposed, and the elements re-uniting form tar, which is received in a hole dug for the purpose. It is prepared in this manner in the north of Europe, and in a similar way from the *Pinus australis* in the United States. Tar is composed of oxygen, hydrogen, and carbon, or of empyreumatic oil, resin, and acetic acid.—PROP. Stimulant, diuretic, diaphoretic.—Generally exhibited under the form of *tar water*, which is made by stirring two pints of tar with a gallon of water for a quarter of an hour, and straining after the tar has subsided. From Oj. to Oij. may be taken during the day. For its external use, see the OFF. PREP. *Unguentum Picis liquidæ.*

PIX NIGRA. *Black Pitch.*—This is formed by the inspissation of tar by boiling. See *Pix liquida.*—PROP. The same as tar. For its external use, see the OFF. PREP. *Unguentum Picis nigræ.*

PLUMBI SUBCARBONAS. *Subcarbonate of Lead.* vulg. *White Lead.*—This is a carbonate and not a *subcarbonate*, consisting of one atom of the protoxide of lead and one atom of acetic acid. It is formed on the large scale, by rolling up sheets of lead and placing them in earthen pots. Vinegar is poured into the pots, but not so high as to touch the lead, which rests on a ledge in the pot. The pots are then buried in fresh stable litter for about two months. The heat of the dung raises the vinegar into vapour, which oxidizes the lead at the surface, and then it combines with the carbonic acid given off by the fermentation of the dung. The carbonate of lead thus formed is afterwards removed from the surface of the sheets, and is ground in mills.—USE. This poisonous salt is employed externally as an astringent by sprinkling it on excoriated surfaces. It is never given internally.—OFF. PREP. *Plumbi Acetas.*

PLUMBI OXYDUM SEMIVITREUM. *Semivitrified Oxide of Lead.* This is protoxide of lead semivitrefied. It is prepared by submitting lead to the action of heat and air in a wind furnace till it becomes oxidized. The lead is kept at a red heat by a blast of air from a large pair of bellows directed on its surface ; as the oxide forms it is removed, and a fresh surface of lead exposed until the whole is oxidized. This preparation of lead is only employed pharmaceutically for forming the OFF. PREP. *Liquor Plumbi Subacetatis ; Emplastrum Plumbi ; Ceratum Saponis.*

PORRI RADIX. *Root of the Leek.*—Allium Porrum. *The Leek.* Hexandria Monogynia. *N. O.* Spathaceæ, *L.* Asphodeli, *J.* Biennial. Native of Switzerland, but cultivated in several countries. The virtues depend on a volatile oil.—PROP. Stimulant, diuretic.—DOSE, of the juice, f℥ſs. to f℥ij. mixed with syrup.

POTASSÆ NITRAS. *Nitrate of Potash. Nitre.*—This is produced *naturally*, and is found effloresced on the surface of the soil in several parts of the world. This country is chiefly supplied from India. It is principally formed *artifically* in Germany and France in nitre-beds, which are made of a mixture of putrefying animal and vegetable matters, old mortar, chalk, &c. These beds are covered over with a roof to keep them from the weather, and are sometimes turned up and moistened with urine or putrid water. Decomposition takes place, and amongst other gases azote and oxygen are evolved, which reuniting form nitric acid; this by combining partly with lime gives rise to nitrate of lime, whilst another portion unites with potash, forming nitrate of potash. The presence of potash is not so easily accounted for: it is supposed by some to be ready formed, whilst others believe that it is formed during the process. When the compost is sufficiently mature, which it will be in about two years, it is mixed with wood ashes, or impure potash, which decomposes the nitrate of lime, and forms more nitrate of potash. The whole of this salt is separated from other salts and impurities by lixiviation, and other manipulatory processes. This is a brief outline of the artificial formation of nitre, but both this and its natural production have long engaged the attention of philosophers, and the theory is still involved in obscurity. It consists of one atom of nitric acid and one atom of potash, and its crystals contain no water of crystallization. *The Sal Prunelle* of the shops is formed by fusing nitrate of potash, by which means the acid of the salt parts with a portion of oxygen and is reduced to nitrous acid; so that the nitrate is reduced to nitrite of potash. It is then cast into moulds.—PROP. Internally, refrigerent, diuretic: externally, it is detergent and cooling, when applied in a state of solution.—DOSE, gr. x. to ℈j.—OFF. PREP. *Acidum nitricum; Unguentum Sulphuris C.*

POTASSÆ SULPHAS. *Sulphate of Potash.*—A formula for preparing this salt is given in the *Pharmacopœia,* which see. It is named in the *Materia Medica* on account of its being plentifully furnished in the markets. It is formed on the large scale during the process of the distillation of nitrous acid from a mixture of nitrate of potash and sulphate of iron. The sulphuric acid of the sulphate of iron unites with the potash of the nitrate, forming sulphate of potash; and the protoxide of iron of the sulphate of iron is converted into peroxide by abstracting oxygen from the nitric acid, which is thus reduced to nitrous acid. The sulphate of potash is then separated from the peroxide of iron by solution, and is afterwards crystallized.

POTASSÆ SUPERTARTRAS. *Supertartrate of Potash.*—This salt, which in strict language is a *bitartrate* consisting of two atoms of acid to one of base, is contained in the juice of the grape, and is gradually deposited in wine casks. It is met with of a dusky red colour, and of a lighter colour, according to the wine from which it has been obtained, and is known in commerce under the names of *red* and *white tartar.* It is purified by solution, and boiling in water, with the addition of whites of eggs, and finely sifted wood-ashes. Effervescence ensues, and the red scum which rises is removed. It is then allowed to crystallize.—PROP. Aperient, diuretic, refrigerant. As it acts powerfully on the absorbents, it is used as a purgative and diuretic in dropsies.—DOSE, from ʒj. to ℥j. It ought to be given in substance when large doses are required, on account of its great insolubility. As a refrigerant, however, it may be given dissolved in water, and sweetened with sugar.—OFF. PREP. *Ferrum Tartarizatum ; Potassæ Tartras ; Antimonium Tartarizatum ; Soda Tartarizata ; Pulvis Sennæ C.*

POTASSA IMPURA. *Impure Potash,* or rather *impure subcarbonate (carbonate) of Potash.*—This salt which is met with in commerce, and which contains many impurities, is known under the name of *potash.* It is obtained by lixiviating the ashes of land plants which grow at a distance from the sea. When deprived of the brown colour which it possesses when first prepared, it is then called *pearl-ash.* See the Off. Prep. *Potassæ Subcarbonas.*

PRUNA. *Prunes.—Prunus domestica. The common Plum-tree.* Icosandria Monogynia. *N. O.* Pomaceæ, *L.* Rosaceæ, *J.* Originally from Asia, and Greece, but now natural to this and other countries. The dried fruit met with in the shops is brought from the Continent.—Prop. Mildly aperient. — Off. Prep. *Confectio Sennæ.*

PTEROCARPI LIGNUM. *Red Saunders Wood.*—Pterocarpus Santalinus. *Red Saunders-tree.* Diadelphia Decandria. *N. O.* Papilionaceæ. Native of the Indian mountains. The wood is employed as a colouring matter: it yields its colour to alcohol and ether; but not to water.—Off. Prep. *Spiritus Lavandulæ C.*

PULEGIUM. *Pennyroyal.*—Mentha Pulegium. *Pennyroyal.* Didynamia Gymnospermia. *N. O.* Verticillatæ, *L.* Labiatæ, *J.* This indigenous, perennial plant is found on heaths and in moist meadows. It flowers in September. It is cultivated for medicinal uses. Its virtues reside in a volatile oil.—Prop. It has been considered as emmenagogue, and anti-hysteric, but is now seldom employed.—Off. Prep. *Aqua Pulegii; Oleum Pulegii; Spiritus Pulegii.*

PYRETHRI RADIX. *Root of the Pellitory of Spain.*—Anthemis Pyrethrum. *Pellitory of Spain.* Syngenesia Superflua. *N. O.* Compositæ Discoideæ, *L,* Corymbiferæ, *J.* This perennial plant is a native of the Levant, the south of Europe, and Barbary. The pungency of the root appears to be resident in a fixed oil.—Prop. Sialagogue. It is chewed in the mouth in paralysis of the tongue, and muscles of the fauces, and is also serviceable in apoplexy, rheumatism of the face, tooth-ache, &c. It may also be employed under the form of decoction as a gargle in relaxations of the uvula, &c.

QUASSIÆ LIGNUM. *Quassia Wood.*—Quassia excelsa. *Lofty Quassia,* or *Bitter Ash.* Decandria Monogynia. *N. O.* Gruinales, *L.* Magnoliæ, *J.* This tree, which sometimes attains the height of one hundred feet, is a native of Surinam, Jamaica, and the Caribbean Islands. The bitter principle of quassia has been termed *quassine*. For properties, &c. see the OFF. PREP. *Infusum Quassiæ.*

QUERCUS CORTEX. *Bark of the Oak.*—Quercus pedunculata. *Common White Oak.* Monœcia Polyandria, *N. O.* Amentaceæ. Indigenous. It is likewise met with throughout Europe, and the north of both Asia and Africa. The bark should be collected for medicinal use from the smaller branches, in the spring, as at that season it contains more *tannin*, a principle on which its properties depend.—PROP. Tonic and astringent.—DOSE, gr. xv. to ℨss. It is, however, chiefly employed as a local astringent under the form of the OFF. PREP. *Decoctum Quercus.*

RESINA FLAVA. *Yellow Resin.*—This substance is left in the retort after the distillation of oil of turpentine from the common turpentine of the *Pinus sylvestris;* see *Terebinthinæ Oleum.* It is employed only externally, and enters into the composition of plasters and ointments.

RHAMNI BACCÆ. *Berries of Buckthorn.*—Rhamnus catharticus. *Purging Buckthorn.* Pentandria Monogynia. *N. O.* Dumosæ, *L.* Rhamni, *J.* An indigenous shrub. It is found in woods and near brooks. It flowers in May and June, and its berries ripen in October. The male and female flowers are sometimes, but not always, upon different plants.—PROP. Cathartic, but griping in their operation.—DOSE, ℈j. of the fresh, or ℨj. of the dried berries, or f℥j. of the expressed juice. They are, however, seldom employed.—OFF. PREP. *Syrupus Rhamni.*

RHEI RADIX. *Root of Rhubarb.*—Rheum palmatum. *Palmatum Rhubarb.* Enneandria Trigynia. *N. O.* Holoraceæ, *L.* Polygoniæ, *J.* China and Tartary. Perennial. Of different species of *Rheum*, it is doubtful which yields the rhubarb received from abroad. There are three sorts in the market: the *Russian*, *Turkey*, and *East Indian* or *China* rhubarb, which are so named from the places they are brought from. Good Turkey or Russian rhubarb, when powdered, is of a bright buff-yellow colour. The East Indian or Chinese is of a redder yellow, when powdered.—PROP. Stomachic, astringent, in DOSES of gr. v.; or purgative, in DOSES of ℈j. to ʒj. It acts best as a purgative in substance, powdered, and may be advantageously conjoined with calomel or the neutral salts, which materially assist its action, and admit of the usual dose being decreased.—OFF. PREP. *Infusum Rhei; Tinctura Rhei; Tinctura Rhei, C.*

RHŒADOS PETALA. *Petals of the Red Poppy.*—Papaver Rhœas. *The Red* or *Corn Poppy.* Polyandria Monogynia. *N. O.* Rhœdœæ, *L.* Papaveraceæ, *J.* This indigenous, annual plant is found in corn-fields and waste places. Its flowers, which are scarlet, appear in June and July. The capsules contain opium, but the petals, which should be collected when they begin to blow, (as they soon fall off when expanded) are the only part employed pharmaceutically. They are merely used as a colouring matter.—OFF. PREP. *Syrupus Rhœados.*

RICINI OLEUM ET SEMINA. *Castor Oil and Seeds.* Ricinus communis. *Common Ricinus* or *Palma Christi.* Monœcia Monadelphia. *N. O.* Tricoccæ, *L.* Euphorbiæ, *J.* This annual plant is a native of some parts of the four quarters of the globe. Until of late, the oil was extracted from the seeds by boiling them in water, being previously deprived of their husks, and bruised, and then tied up in a bag. The oil rising to the top of the water was then removed by skimming. It is still obtained in this way in the West Indies; but the greater part is now procured in this country and abroad, by expression. Castor oil is heavier than the other expressed oils.—PROP. The seeds are drastic cathartic, but are now seldom employed medicinally. The oil is a quickly operating and mild aperient, and may be administered in all cases where the generality of purgatives produce irritation. It is also an eligible aperient on account of its leaving the bowels in an open state after its immediate action has subsided.—DOSE, from ℨij. to ℥iss. on water, coffee, or any other convenient liquid.

ROSA. *The Rose.*—Icosandria Polygynia. *N. O.* Senticosæ, *L.* Rosaceæ, *J.*

ROSA CENTIFOLIA. *The Hundred-leaved Rose.*

ROSA GALLICA. *The French* or *Red Rose.*

ROSA CANINA. *The Dog Rose* or *Hip Tree.*

ROSÆ CANINÆ PULPA. *Pulp of the Dog-rose,* or *Hip.*—The last of the above named species is indigenous, growing in hedges, and flowering in June. The pulp of the fruit contains citric acid and sugar. It is used for forming the OFF. PREP. *Confectio Rosæ Caninæ.*

ROSÆ CENTIFOLIÆ PETALA. *Petals of the Hundred-leaved Rose.*—It is not known of what country the first of the above named species is a native, but it is now found in a state of cultivation throughout Europe, flowering in June. The petals are large, numerous, and of a pale red colour. There are several varieties of this species, all of which may be employed medicinally. The petals are gently laxative. They are, however, principally used in forming the OFF. PREP. *Aqua Rosæ ; Syrupus Rosæ.*

ROSÆ GALLICÆ PETALA. *Petals of the Red Rose.*—The second of the above named species is a native of the south of Europe, and is cultivated in our gardens. The flowers are of a deep crimson colour, and appear in June and July. The petals of the unblown buds are employed for medicinal purposes. They are tonic and astringent, and enter into the OFF. PREP. *Confectio Rosæ ; Infusum Rosæ ; Mel Rosæ.*

ROSMARINI CACUMINA. *Tops of Rosemary.*—Rosmarinus officinalis. *Officinal Rosemary.* Diandria Monogynia. *N. O.* Verticillatæ, *L.* Labiatæ, *J.* South of Europe. It is cultivated in this country as an ornamental evergreen, and flowers in April and May. The virtues of rosemary reside in an essential oil.—PROP.

Stimulant, and said to be emmenagogue.—Dose, gr. x. to ℈ij. of the tops powdered.—Off. Prep. *Oleum Rosmarini; Spiritus Rosmarini.*

RUBIÆ RADIX. *Root of Madder.*—Rubia Tinctorum. *Dyers' Madder.* Tetrandria Monogynia. *N. O.* Stellatæ, *L.* Rubiaceæ, *J.* Native of the south of Europe, the Levant, and Africa. It is a perennial plant, with annual stems. The root is dug up in the third summer of its growth, and dried in a stove constructed for the purpose. It is afterwards thrashed to remove the cuticle, and then it is more completely dried and pounded. The colouring principle of madder resides in extractive matter.—The properties of madder, in a medical point of view, are in the present day considered doubtful, but it was formerly exhibited as an emmenagogue.—Dose, gr. xv. to ℈j.

RUTÆ FOLIA. *Leaves of Rue.*—Ruta graveolens. *Common Rue.* Decandria Monogynia. *N. O.* Multisiliquæ, *L.* Rutaceæ, *J.* A perennial evergreen. South of Europe. Cultivated in this country in gardens, and flowers in June and September. The virtues of the leaves reside in a volatile oil.—Prop. Stimulant, antispasmodic, emmenagogue.—Dose, gr. xv. to ℈ij. of the dried leaves powdered.—Off. Prep. *Confectio Rutæ.*

SABINÆ FOLIA. *Leaves of Savine.*—Juniperus Sabina. *Savine.* Diœcia Monadelphia. *N. O.* Coniferæ. This shrub is a native of the south of Europe and the Levant. Cultivated in this country, and flowers in May and June. The male and female flowers appear on different plants. The unpleasant odour and taste of savine reside in an essential oil.—Prop. Diaphoretic, emmenagogue, anthelmintic.—Dose, gr. iv. to gr. x. of the dried leaves powdered; but, on account of its very powerful and poisonous qualities, it must be given with great caution.—Off. Prep. *Ceratum Sabinæ.*

SACCHARAM. *Moist Sugar.*

SACCHARUM PURIFICATUM. *Double-refined Sugar.*

SACCHARUM OFFICINALE. *Common Sugar-cane.*— Triandria Digynia. *N. O.* Gramina. Native of the East and West Indies. It is *cultivated* for the purpose of procuring sugar. There are two varieties of the above species. After the canes are cut they are stripped of their leaves, and crushed between iron rollers for the purpose of expressing the juice, which flows into large leaden receivers. It then undergoes the process of clarifying, which is effected by heating it to about 140°, being previously mixed with lime ; a thick scum rises to the top, and the clear liquor below is drawn off and boiled until the quantity is considerably reduced. This boiling is afterwards repeated in different coppers, from the last of which it is removed into wooden coolers, where it grains, the concrete portion separating from the *molasses.* The concrete mass is brought to this country under the name of *raw* or *muscovado* sugar, where it is subjected to two other processes of refinement. Sugar is a proximate vegetable principle, composed of oxygen, hydrogen, and carbon. As an article of diet it is wholesome and nutritious. It is employed pharmaceutically, and enters into the *Confections* and *Syrups.*

SAGAPENUM. *Sagapenum.*—This substance is the gum-resin of an unknown Persian plant.—PROP. Antispasmodic, emmenagogue. Externally, discutient.— DOSE, gr. x. to ℨss. in the form of pill.—OFF. PREP. *Pilulæ Galbani C.*

SALICIS CORTEX. *Bark of the Willow.*—Salix Caprea. *Great round-leaved Sallow.* Diœcia Diandria. *N. O.* Amentaceæ. Indigenous. Found in woods. Flowers in April. Two other species of *Salix* are named in the Dublin Pharmacopœia as possessing medicinal virtues, viz. the *S. fragilis* and *S. alba.* Besides tannin, and resinous and extractive matter, there has lately been discovered a peculiar principle in willow bark, termed *salicine.*—PROP. Tonic, astringent. Willow bark has been employed as a substitute for cinchona, and in phthisis and hectic fever it is said to be preferable to it.— DOSE, ℨss. to ℨj. combined with some aromatic, or with cinchona bark. It may also be given in the form of decoction.

SAMBUCI FLORES. *Flowers of Elder.*—Sambucus nigra. *Common Elder.* Pentandria Trigynia. *N. O.* Dumosæ, *L.* Caprifoliæ, *J.* Indigenous. Grows in hedges. Flowers in June, and the berries ripen in September. The ripe berries yield a purple juice by expression, which contains saccharine matter, jelly, and malic acid. It is used for making a well known domestic and wholesome wine. The flowers yield an oil by distillation with water. —PROP. The flowers only are ordered officinally by the London College. They, as well as the berries, are said to be diaphoretic and aperient given internally. The flowers are chiefly employed externally in fomentations, and ointments. The inner bark is a hydragogue cathartic in DOSES of gr. x. to ʒss.—OFF. PREP. *Unguentum Sambuci.*

SAPO DURUS. *Hard Soap.*

SAPO MOLLIS. *Soft Soap.*

The former of these is made from oil of olives and soda, and the Spanish sort is ordered on account of grease, tallow, &c. being used in the manufacture of soap in this country, instead of olive oil, which is too expensive. Soft soap is made from olive oil and potash. The following is a brief outline of the Spanish mode of manufacturing soap, and is similar to that resorted to in this country. To a certain quantity of powdered barilla (impure carbonate of soda) a given quantity of fresh lime is added, which removes the carbonic acid. Water being employed in the process, a strong ley consisting of a solution of caustic soda is obtained, which is drawn off. Water being twice more added to the dregs, a *second* and a *third* ley is afforded. The last ley, mixed with as much olive oil as is equal to the weight of barilla employed, is boiled in an iron vessel, and during the boiling the second and part of the first ley is added. The mixture is constantly stirred while boiling with a wooden pole. When it becomes thick, a little common salt is added, and the boiling is continued for about half an hour longer, and then the fire is removed. In a few hours, the clear liquor which separates is drawn off, and the unfinished soap is again boiled with some fresh water, and what remains of the first ley. When the fluid of this boiling has separated, it is heated with more water, and then poured into frames to cool. The blue, marbled appearance of Castile soap is owing to the addition of sulphate of iron, and the red, to the red oxide of iron, which are added during a part of the process. In the manufacture of soft soap, a ley of caustic potash is employed instead of the soda ley. —Soap is a chemical compound, consisting of a base united with margaric and oleic acids, which are generated from the *steräin* and *eläin* contained in the fixed oils, tallow, &c. The base of a soap may be either an alkali, an earth, or the oxide of a metal. All soaps are not soluble in water.—PROP. Aperient, diuretic, lithontriptic, antacid. Externally, detergent and stimulant. Soft soap is only employed for outward purposes.—DOSE, gr. iij. to ʒss. of the hard sort, made into pills.—OFF. PREP. *Pilulæ Saponis cum Opio; Pil. Scillæ C.; Emplastrum Saponis; Ceratum Saponis; Linimentum Saponis C.*

SARSAPARILLÆ RADIX. *Root of Sarsaparilla.*—Smilax Sarsaparilla. *Sarsaparilla.* Diœcia Hexandria. *N. O.* Sarmentaceæ, *L.* Asparagi, *J.* This perennial plant is a native of North and South America. There are numerous species of *smilax*, and the roots of several of these are collected under the name of *sarsaparilla*. The virtues of the root reside in the bark, the ligneous part being inert. An alkaline principle has been obtained from the root which has been termed *parillina*, and the medicinal efficacy is supposed to be dependant upon it. The Jamaica Sarsaparilla is considered the best, on account of its yielding more extractive matter than the other sorts.—PROP. Demulcent, diuretic. It was formerly given for the cure of syphilis, but it is now employed only in conjunction with mercury in some stages of that disease, and practitioners differ in opinion respecting its action as well as its efficacy. M. Pallota, the discoverer of parillina, has tried the effects of that alkali upon himself, and he finds it productive of great debility, decreasing the vital energy according to the extent of the dose.—Dose, ℈j. to ʒj. of the root powdered. Of the parillina from gr. ij. to gr. xiii.—Off. Prep. *Decoctum Sarsaparillæ; Decoctum Sarsaparillæ C.; Extractum Sarsaparillæ; Syrupus Sarsaparillæ.*

SASSAFRAS LIGNUM ET RADIX. *Wood and Root of Sassafras.*—Laurus Sassafras. *Sassafras Laurel.* Enneandria Monogynia. *N. O.* Oleraceæ, *L.* Lauri, *J.* Southern parts of North America, and Cochin China. Cultivated in Jamaica. The wood, root, and bark, of this species of laurel, contain an essential oil, which is heavier than water, and on this their virtues depend.—Prop. Diaphoretic, diuretic; but its efficacy is uncertain. An infusion made of the chips may be drank ad libitum.—Off. Prep. *Decoctum Sarsaparillæ C.*

SCAMMONEÆ GUMMI-RESINA. *Gum Resin of Scammony.*—Convolvolus Scammonea. *Scammony.* Pentandria Monogynia. *N. O.* Campanaceæ, *L.* Convolvuli, *J.* Syria and Cochin China. Perennial. The principal part of the scammony met with in commerce, is obtained from the plants found on the mountains between Aleppo and Latachea. It is procured from the root. The ground being cleared away and the top cut off, the scammony flows as a milky juice, and is collected in a shell, or some other vessel, placed to receive it. After a time it becomes hard. The Jews purchase it while soft, and adulterate it with a variety of substances. The Aleppo scammony is considered the best, that from Smyrna being more mixed with impurities. Scammony contains resin, extractive, gum, and sometimes more than half of impurities.—Prop. Drastic hydragogue cathartic.—Dose, gr. v. to gr. xvj. It should be conjoined with some aromatic as it is apt to gripe.—Off. Prep. *Confectio Scammoneæ; Pulvis Scammoneæ C.; Extractum Colocynthidis C.; Pulvis Sennæ C.*

SCILLÆ RADIX. *Root of Squill.*—Scilla maritima. *Officinal Squill.* Hexandria Monogynia. *N. O.* Coronariæ, *L.* Asphodeli, *J.* Native of Sicily and countries bordering on the Mediterranean. The bulb which is very large, is the part employed medicinally. There are two varieties of the above species, one with a white, the other with a reddish bulb, both of which are used, as their virtues are the same. Amongst other substances, squills contain a peculiar bitter principle termed *scillitin*, which is most predominant, and on this their virtues depend.—PROP. In DOSES of gr. ss. to gr. i. or more, dried and powdered, it is a stimulating expectorant, and diuretic: care must be taken not to administer it during the active stage of pulmonary inflammation. In larger doses it is purgative and emetic. To effect the latter object the vinegar or oxymel is employed.—OFF. PREP. *Acetum Scillæ; Oxymel Scillæ; Pilulæ Scillæ C.; Tinctura Scillæ.*

SENEGÆ RADIX. *Root of Senega.*—Polygala Senega. *Seneka* or *Rattlesnake Root.* Diadelphia Octandria. *N. O.* Lomentaceæ, *L.* Pediculares, *J.* This perennial plant is a native of North America. The pungency of Senega root is resident in the bark, and is owing to a peculiar alkaline salt composed of an acid called *polygalinic* and a base termed *polygalina.*—PROP. Stimulant expectorant, diuretic, and, if given in large doses, emetic and purgative.—DOSE, gr. x. to ʒj. in powder, combined with some aromatic, or with opium or camphor.—OFF. PREP. *Decoctum Senegæ.*

SENNÆ FOLIA. *Leaves of Senna.*—Cassia Senna. *Senna.* Decandria Monogynia. *N. O.* Lomentaceæ, *L.* Leguminosæ, *J.* This is an annual plant, and a native of Upper Egypt, and Bernou in central Africa, but the best is said to grow in Nubia. It is imported into Europe from Alexandria. The leaves of this species of cassia are liable to be adulterated, not only with the leaves of other species of cassia, but also with those of other plants. The active principle of senna is an uncrystallizable saline compound termed *cathartine.*—PROP. Cathartic.—DOSE, ℈j. to ʒj. of the powdered leaves. It should be conjoined with some aromatic to correct its griping qualities. It is, however, more usually given under the form of some of the OFF. PREP. *Confectio Sennæ; Infusum Sennæ C.; Pulvis Sennæ C.; Syrupus Sennæ; Tinctura Sennæ.*

SERPENTARIÆ RADIX. *Serpentary,* or *Virginia Snake Root.*—Aristolochia Serpentaria. *Virginia Snake Root* or *Birthwort.* Gynandria Hexandria. *N. O.* Sarmentaceæ, *L.* Aristolochiæ, *J.* This perennial plant is a native of North America. The virtues of the root depend on a bitter resin and an essential oil.—PROP. Stimulating diaphoretic, tonic.—DOSE, gr. x. to ℈j. or more, powdered; or it may be given in the form of infusion made in the proportion of ℥j. of the root to f℥xij. of water, of which f℥j. or more is a dose.—OFF. PREP. *Tinctura Serpentariæ; Tinctura Cinchonæ C.*

SEVUM. (*Mutton*) *Suet.*—Ovis Aries. *The Sheep.* Mammalia Pecora. This animal, of which there are several varieties, is found in almost all countries. The suet is taken from around the kidneys and loins. By distillation it affords the oleic and margaritic acids in abundance.—PROP. Emollient. It is chiefly employed externally, in plasters and ointments.—OFF. PREP. *Sevum præparatum.*

SIMAROUBÆ CORTEX. *Simarouba Bark.*—Quassia Simarouba. *Simarouba Quassia.* Decandria Monogynia. *N. O.* Gruinales, *L.* Magnoliæ, *J.* In Jamaica this tree is known under the name of the *mountain damson.* It is a native of South America, Carolina, and the West Indian Islands. The bark of the root is the part of the tree used medicinally. Amongst a variety of substances it contains a peculiar bitter principle termed *quassine.*—PROP. Tonic.—DOSE, ℈j. to ʒss. powdered, but the OFF. PREP. *Infusum Simaroubæ* is a better form for exhibition.

SINAPIS SEMINA. *Mustard Seeds.*—Sinapis nigra. *Common Mustard.* Tetradynamia Siliquosa. *N. O.* Siliquosæ, *L.* Cruciferæ, *J.* An indigenous annual, flowering in June. It is *cultivated* for medicinal and other purposes. The seeds yield a fixed oil, and when distilled with water, an acrid volatile oil on which their virtues depend, and they also contain an ammoniacal salt, together with starch and mucus.—PROP. Stimulant, diuretic, emetic, and externally, rubefacient.—DOSE, ʒj. to ℥ss. bruised.—OFF. PREP. *Cataplasma Sinapis; Infusum Armoraciæ C.*

SODÆ MURIAS. *Muriate of Soda. Common Salt.*—This is found very plentifully in every country of the globe. It is contained in sea water, mineral springs, lakes, and in extensive strata under the earth, and sometimes mountains are composed of it. The principal part of the salt used in this country is obtained in Cheshire, where it is pumped out of deep wells in the form of brine, which is evaporated by means of heat, and partly separated from impurities. Bay salt is obtained by evaporating sea water by the heat of the sun in warm climates. Common salt, as met with in commerce, contains muriate of lime, muriate of magnesia, sulphate of lime, &c. Its deliquescence is owing to the muriate of magnesia. It is soluble to the same extent in both hot and cold water. In its dry state it is a chloride of sodium, consisting of 1 atom of chlorine and 1 atom of sodium, and is only a muriate when in solution in water, in which case its chlorine combines with the hydrogen of the water, forming muriatic acid, while the sodium unites with the oxygen of the water and forms soda.—PROP. Tonic, anthelmintic, in DOSES of gr. x. to ʒj. Aperient, in DOSES of ℥ss. to ℥j. It requires to be much diluted with water. Externally it is stimulant. The common domestic enema is made by dissolving ℥ss. to ℥j. in Oj. of water.

SODÆ SUB-BORAS. *Sub-borate of Soda. Borax.*—This salt is found native in Thibet and Persia, and is purified as an article of commerce. In Thibet it is taken from the bed of a lake at the edges and shallow parts, and although considerable masses are continually removed, yet the quantity does not diminish, fresh depositions of the salt being daily made from the water of the lake, which is supplied by springs at the bottom. When first procured it is called *tincal.* Its name given by the college is incorrect, it being a *bi-borate* composed of two atoms of boracic acid, and one atom of soda.—PROP. Refrigerant, detergent.—It is useful as a local application in aphthous affections of the mouth, &c., and may either be applied dissolved in water, or in a powdered state mixed with honey.

SODÆ SULPHAS. *Sulphate of Soda.*—Found native. Sometimes it is met with in an efflorescent state on the surface of the earth in the vicinity of salt lakes. It is also contained in some mineral springs; and is likewise found along with oxide of iron, and carbonate and muriate of soda. It is formed extensively during the manufacture of several compounds. For its properties, &c., see the formula for preparing it in the *Pharmacopœia*.

SODA IMPURA. *Impure Soda*, or *Impure Subcarbonate (Carbonate) of Soda.*—Found native in several parts of the globe, on the surface of the ground, and on the margins of some lakes which are dried up during the summer season. The markets are, however, chiefly supplied with that sort, called *barilla*, or *kelp*, which is the ashes of sea plants. Barilla is obtained from plants of the *algæ* species, but the *salsola soda* yields more of the carbonate of soda, and is cultivated on the shores of Spain for procuring barilla. Kelp, which is an inferior article to barilla, is formed in this country by burning the *sea-wrack*. It is said that the carbonate of soda exists in the plants from which it is derived, ready formed. An article called *English barilla*, formed by igniting sulphate of soda, is employed by soap-makers in the manufacture of common soaps: the sulphate by ignition with charcoal is converted into carbonate. For the properties, &c. of this salt, see the preparation *Sodæ Subcarbonas* in the *Pharmacopœia*.

SPARTII CACUMINA. *Broom Tops.*—Spartium scoparium. *Common Broom.* Diadelphia Decandria. *N. O.* Papilionaceæ. An indigenous shrub, flowering in May and June.—PROP. Diuretic, aperient. ℥j. of the fresh tops boiled in a pint of water till reduced to about half, forms a decoction, of which f℥j. may be given every hour until it operates.

SPIGELIÆ RADIX. *Root of the Indian Pink.*—*Spigelia Marilandica. Indian Pink*, or *Perennial Worm Grass.* Pentandria Monogynia. *N. O.* Stellatæ, *L.* Gentianæ, *J.* A perennial plant, native of the warmer parts of North America.—PROP. Purgative, anthelmintic. It is efficacious in the expulsion of lumbrici.—Dose, gr. x. to ℈j. powdered, combined with calomel, &c. It may also be given under the form of infusion.

SPIRITUS RECTIFICATUS. *Rectified Spirit.*—This consists of alcohol somewhat diluted with water. Its sp. gr. as stated by the college, is to that of distilled water, as .835 to 1000. A formula for procuring a stronger spirit is given under the article *alcohol*, in the *Pharmacopœia.* Alcohol, which is the basis of all ardent spirits, wines, beer, &c., is generated during the vinous fermentation of substances which contain saccharine matter. Brandy, rum, and other ardent spirits, are obtained by distilling wines and fermented liquors, and the peculiar flavour of each is owing to some principle with which the alcohol is combined. Rectified spirit may be obtained from rum, brandy, malt spirits, &c., by re-distillation with water, or rectification, as it is called. Rectified spirit is colourless, it boils at about 163° Fahrt., and remains fluid at the lowest known temperatures. When of the above sp. gr. 100 parts, consist of 85 pure alcohol, and 15 water.—Prop. Powerfully stimulant taken internally, and externally applied it produces a great degree of cold in consequence of the rapidity with which it evaporates. It is only employed in its undiluted state as a pharmaceutical agent in forming some of the *Spirits, Tinctures, Extracts, Mixtures, &c.*

SPIRITUS TENUIOR. *Proof Spirit.*—This consists of rectified spirit diluted to a certain extent with water. Its sp. gr. as stated by the college, is to that of distilled water, as .930 to 1000. It is employed pharmaceutically in forming some of the *Spirits, Tinctures, Extracts,* and other preparations, in which the rectified spirit is not required.

SPONGIA. *Sponge.* — Spongia officinalis. *Officinal Sponge.* Vermes Zoophyta. This species is found principally in the Mediterranean and Red Seas. Sponges are attached to the bottoms of rocks, whence they are brought up by divers. They are animals of a peculiar structure; their mouths consist of the ends of a number of branched tubes, which open on the surface, through which the food is received, and the fæces discharged. These mouths are guarded with fine spines, and the tubes are filled with a gelatinous substance, sometimes mixed with shells and sand. Sponge may be cleaned, and made very soft by washing it in very dilute muriatic acid, and afterwards with water. In this state it may be applied to a variety of uses in surgery, &c. For the medical properties of sponge, see the OFF. PREP. *Spongia usta.*

STANNUM. *Tin.*—This metal is found in Cornwall, Bohemia, Spain, and in the Malacca peninsula in Asia. It is met with in a metallic state, united with sulphur and copper, and in a state of oxidation along with silex and oxide of iron, when it is called *tin stone.* From this the best tin of Cornwall is obtained. The ore is washed, bruised, and sifted, and then smelted with charcoal, in a blast furnace; the metallic tin flows through a hole at the bottom of the furnace into a pit below, and is afterwards purified by a peculiar process. After being fused its sp. gr. is 7.29. Its melting point is 442° Fahrt. Tin filings, or tin powder, ordered by the College, is prepared by agitating melted tin in a heated mortar, with a heated pestle, until it cools, or it may be shaken in a wooden box.—PROP. Anthelmintic. Supposed to act merely in a mechanical manner; but Dr. Murray thinks it generates hydrogen gas in the intestines, which proves noxious to the animal.—DOSE, ʒj. to ʒij. of the powder, mixed with treacle, to be taken in the morning, and followed by a strong aperient.

STAPHISAGRIÆ SEMINA. *Seeds of Staves-acre.*—Delphinium Staphisagria. *Staves-acre.* Polyandria Trigynia. *N. O.* Multisiliquæ, *L.* Ranunculaceæ, *J.* This is a species of larkspur and is a biennial plant. It is native of the south of Europe. The seeds are for the most part imported from Italy. Their active principle resides in a vegetable alkali termed *delphinia.*—PROP. They are violent in their action, producing sickness and purging to a great extent, and are therefore confined to external application, and are principally used in a powdered state, mixed with hair powder for the destruction of pediculi.

STRAMONII SEMINA ET FOLIA. *Seeds and Leaves of Stramonium.*—Datura Stramonium. *Thorn-apple.* Pentandria Monogynia. *N. O.* Solanaceæ, *L.* Solaneæ, *J.* Annual. Native of America. It is now found in this country, and flowers in July and August. The seeds are contained in a large, fleshy, four-corned capsule, which is covered with sharp spines, and is four-celled at the base, and two-celled at the apex. The seeds contain an alkaline principle termed *daturia*, which is combined with malic acid. Stramonium is smoked for the purpose of relieving the paroxysm of spasmodic asthma. For its internal exhibition see the OFF. PREP. *Extractum Stramonii.*

STYRACIS BALSAMUM. *Balsam of Storax.*—Styrax officinale. *Officinal Storax.* Decandria Monogynia. *N. O.* Bicornes, *L.* Guaiacinæ, *J.* This tree is a native of the south of Europe and the Levant. The balsam is obtained artificially by making incisions into the bark. Two sorts are met with in the market, one in tear which is genuine; the other is of a red colour, in lump, and is said to be mixed with saw-dust, &c. It consists of resin, benzoic acid, and an empyreumatic oil.—PROP. Stimulant, and slightly expectorant. It is now only employed on account of its fragrance.—DOSE, gr. x. to ʒss.—OFF. PREP. *Tinctura Benzoini C.*

SUCCINUM. AMBER.—This is supposed to be a vegetable substance of antediluvian origin. It is dug out of the earth in Prussia near the sea-coast, and is thrown up by the sea on the shores of the Baltic. It is composed of resin, empyreumatic oil, and *succinic* acid. It is not used medicinally, but only employed pharmaceutically on account of the oil and acid it contains.—OFF. PREP. *Oleum Succini.*

SULPHUR. *Sulphur.*

SULPHUR SUBLIMATUM. *Sublimed Sulphur.*—Sulphur is found in a native state in the neighbourhood of volcanoes. It has also been found in veins in some primitive rocks. The sulphur of commerce imported from Sicily and Naples is obtained by sublimation from native sulphur. It is procured also by roasting pyrites. This process is carried on very extensively at the Parys copper mines in the isle of Anglesea. Both kinds are brought to market under the form of *roll sulphur*, which is afterwards purified by sublimation, and is then met with in the state of powder, and is the *sulphur sublimatum*. For the medical properties, see *Sulphur Lotum*.—OFF. PREP. *Sulphur Lotum ; Sulphur præcipitatum ; Unguentum Sulphuris ; Unguentum Sulphuris C.*

TABACI FOLIA. *Leaves of Tobacco.*—Nicotiana Tabacum. *Tobacco.* Pentandria Monogynia. *N. O.* Luridæ, *L.* Solaneæ, *J.* This annual plant is a native of America. It is cultivated to a great extent at Virginia, whence the European markets are principally supplied. The virtues of tobacco reside in a peculiar principle called *nicotin.*—PROP. Narcotic, sedative, emetic, diuretic, cathartic, and errhine, forming the basis of the different kinds of snuff. Not administered in substance. See the OFF. PREP. *Infusum Tabaci.*

TAMARINDI PULPA. *The Pulp of the Tamarind.*—Tamarindus Indica. *The Tamarind Tree.* Monadelphia Triandria. *N. O.* Lomentaceæ, *L.* Leguminosæ, *J.* East and West Indies, Egypt and Arabia. The fruit of this large spreading tree consists of thick, compressed, pulpy pods. The West Indian pods are from two to five inches in length, and contain from two to four seeds ; the East Indian are about twice the length, and contain from five to seven seeds. Those gathered in the West Indies after being freed from the shelly fragments, are placed in layers in a cask, and the interstices are then filled by pouring boiling syrup over the tamarinds so as to fill the cask. The East Indian are darker than those from the West Indies, and are preserved without sugar. The pulp of tamarinds contain citric, and malic acids, supertartrate of potash, sugar, gum, jelly, &c.—PROP. Refrigerant and mildly aperient. They are chiefly employed as a delicacy for the sick.—OFF. PREP. *Confectio Cassiæ ; Confectio Sennæ.*

TARAXACI RADIX. *Root of the Dandelion.*—Leontodon Taraxacum. *Dandelion.* Syngenesia Æqualis. *N. O.* Compositæ Semiflosculosi, *L.* Cichoraceæ, *J.* Indigenous, flowering from April to September.—PROP. Diureric, aperient. A strong decoction made by boiling the sliced root in water may be drank ad libitum in jaundice, dropsy, and in cases of deficiency of bile, &c.—OFF. PREP. *Extractum Taraxaci.*

TARTARUM. *Tartar.* See *Potassæ Supertartras.*

TEREBINTHINA CANADENSIS. *Canadian Turpentine.*—Pinus Balsamea. *Balm-of-Gilead Fir.* Monœcia Monadelphia. *N. O.* Coniferæ. This tree is a native of the cold climates of North America. The Canada balsam, or more properly speaking, turpentine, is procured by making incisions through the bark into the wood. Like the turpentines in general it yields by distillation with water a volatile oil, and resin remains in the retort.—PROP. Like the other turpentines it is stimulant, and diuretic, in DOSES of gr. x. to ʒj. It may be given in pills, or made into an emulsion.

TEREBINTHINA CHIA. *Cyprus Turpentine.*—Pistacia Terebinthus. *Chian Turpentine-tree.*—Diœcia Pentandria. *N. O.* Amentaceæ, *L.* Terebintaceæ. *J.* This tree is a native of Barbary and the south of Europe, and is cultivated in the islands of Chios and Cyprus, from the former of which the turpentine is chiefly supplied. It is obtained by making incisions in the bark of the trunk of the tree. Stones are placed at the foot of the tree to receive it as it flows, and on these it is condensed by the cold night air, and the following morning it is scraped off, before sunrise, and is again liquefied by the heat of the sun and strained to free it from impurities. This turpentine is similar in composition and medical properties to those obtained from the different species of *Pinus.*—PROP. Stimulant, diuretic.—DOSE. gr. x. to ʒj.

TEREBINTHINA VULGARIS. *Common Turpentine.*—Pinus sylvestris. *The Wild Pine* or *Scotch Fir.* Monœcia Monadelphia. *N. O.* Coniferæ, *J.* Found wild on the Scotch mountains, and throughout the north of Europe. The turpentine is procured by wounding the trunk of the tree near the ground: the turpentine then exudes, and flows into a hole dug to receive it. Repeated incisions are made into the tree from May to September. It is only yielded during the warm months of the year, and the quantity obtained is in proportion to the heat of the weather. A tree will yield from six to twelve pounds of turpentine annually for a hundred years, commencing when about forty years of age. The turpentine after being procured as above described, is purified by placing it to liquefy in the sun's rays in barrels, which have holes in the bottom for the purpose of allowing it to filter through. It is similar in composition, and medical properties to the turpentines obtained from other species of *pinus* as well as that procured from the *pistacia terebinthus*, being diuretic and stimulant. It is, however, confined to external use, and is employed in the formation of some plasters and ointments.—DOSE. gr. x. to ʒj.

TEREBINTHINÆ OLEUM. *Oil of Turpentine.*—This is procured by distilling the *terebinthina vulgaris* with water. The oil passes into the receiver, and is found swimming on the top of the water, while the resinous part remains in the retort. Oil of turpentine is ranked amongst the essential oils, and resembles them in several of its properties.—PROP. Like the turpentines it is stimulant, diuretic, cathartic, and anthelmintic, according to the proportion in which it is administered.—DOSE, as a diuretic and stimulant, from ♏. x. to fʒij. As an anthelmintic cathartic in tænia, the dose is from f℥ss. to f℥ij. drank in its pure state. Should it not operate in five or six hours, a dose of castor oil ought to be administered: the patient should not drink malt liquor whilst under its influence.—OFF. PREP. *Linimentum Terebinthinæ.*

TESTÆ. *(Oyster) Shells.*—Ostrea edulis. *The common Oyster.* Vermes Testacea. Oyster shells are composed of carbonate of lime and animal matter. They can be of no use in a medicinal point of view. See the OFF. PREP. *Calx è Testis; Testæ præparatæ.*

TIGLII OLEUM. *Croton Oil*—Croton Tiglium. *Purging Croton.* Monœcia Monadelphia. *N. O.* Tricoccæ, *L.* Euphorbiaceæ, *J.* This plant is a native of the Molucca islands, and the greater part of Indostan. The oil is expressed from the seeds which ought to be previously shelled. It consists of a fixed oil, and an acrid principle on which its medical efficacy depends. This principle is resident in the skin of the cotyledons and embryon, and during expression it mixes with the oil of the cotyledons.—PROP. A drastic hydragogue cathartic, very rapid in its action, and requiring to be exhibited with caution. It is chiefly employed in sanguineous apoplexy, and very obstinate costiveness.—DOSE, ♏. j. to ♏. v. made in form of pill with crumbs of bread. In apoplexy, during the fit, it may be applied to the tongue. It operates very pleasantly when administered in the form of suppository in the proportion of, from ♏. v. to ♏. viij. mixed with crumbs of bread.

TORMENTILLÆ RADIX. *Root of Tormentil.*—Tormentilla erecta (officinalis.) *Common Tormentil. Septfoil.* Icosandria Polygynia. *N. O.* Senticosæ, *L.* Rosaceæ, *J.* An indigenous, perennial plant, found upon heaths and in dry pastures. The flowers, which are of a golden-yellow colour, appear in June and July. The active properties of the root reside in tannin, which it contains in abundance.—PROP. Strongly astringent. It may be either given internally, or used locally under the form of decoction, in cases requiring astringent applications.—DOSE, ℈ss. to ℈j. of the root powdered.—OFF. PREP. *Pulvis Cretæ comp.*

TOXICODENDRI FOLIA. *Leaves of the Sumach.*—Rhus Toxicodendron. *The Sumach* or *Poison Oak.* Pentandria Digynia. *N. O.* Dumosæ, *L.* Terebintaceæ, *J.* A North American shrub. The leaves contain tannin, gallic acid, and an acrid narcotic principle on which their virtues depend. This principle is exhaled during the night, and when the plant is not exposed to the sun.—PROP. Stimulant, narcotic.

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—Dose, gr. ss. to gr. iv. of the powdered leaves, in form of pill.

TRAGACANTHA. *Tragacanth.*—Astragalus verus. *True Astragalus.* Diadelphia Decandria. *N. O.* Papilionaceæ, or Leguminosæ, *L.* The shrub from which the gum tragacanth exudes is a native of the North of Persia; but it is doubtful whether it be the *Astragalus verus.*—Prop. Demulcent. It may be sucked in tickling coughs, &c.—Off. Prep. *Pulvis Tragacanthæ C.*

TUSSILAGO. *Coltsfoot.*—Tussilago farfara. *Common Coltsfoot.* Syngenesia superflua. *N. O.* Compositæ Discoideæ, *L.* Corymbiferæ, *J.* An indigenous, perennial plant. The flowers are golden-yellow, and appear in March and April, before the leaves, which do not come forth till May and June.—Prop. Demulcent, expectorant. A decoction, made by boiling the leaves in water, and sweetened with sugar-candy, is the usual form of exhibition. This may be drank occasionally in catarrhal and phthisical complaints. The dried leaves are sometimes smoked for the purpose of exciting expectoration.

VALERIANÆ RADIX. *Root of Valerian.*—Valeriana officinalis (sylvestris.) *Officinal* or *Great Wild Valerian.* Triandria Monogynia. *N. O.* Aggregatæ, *L.* Dipsaceæ, *J.* This is an indigenous, perennial plant, and flowers in June. There are two varieties of it: one is found in woods and marshy situations; the other on heaths and high situations. The roots should either be dug up in the spring before the leaves appear, or in the autumn after they have decayed. The root contains a peculiar essential oil on which its virtues seem to depend.—Prop. Antispasmodic, tonic, emmenagogue.—Dose, ℈j. to ʒj. powdered, which is the best form of exhibition.—Off. Prep. *Tinctura Valerianæ; Tinctura Valerianæ ammoniata.*

VERATRI RADIX. *Root of White Hellebore.*—Veratrum album. *White Hellebore.* Polygamia Monœcia. *N. O.* Coronariæ, *L.* Junci, *J.* This plant is found in the mountainous districts of Greece, Italy, and Switzerland. Every part of it is poisonous. Its active properties depend on an alkaline principle termed *Veratria* which is combined with gallic acid.—PROP. Violently emetic, cathartic, and errhine. It has been given internally in mania and other diseases with advantage, but it is now principally confined to external use.—DOSE, gr. ¼. to gr. ij. As an errhine gr. ij. diluted with gr. xij. of starch or liquorice powder, may be snuffed up the nostrils at an evening, in lethargy and gutta serena.—OFF. PREP. *Decoctum Veratri; Unguentum Veratri; Unguentum Sulphuris C.*

ULMI CORTEX. *Bark of the Elm.*—Ulmus Campestris. *Common Elm.* Pentandria Digynia. *N. O.* Scabridæ, *L.* Amentaceæ, *J.* Indigenous. Flowers in March, or early in April, before the leaves unfold. The inner part of the bark of the younger branches is that which is employed officinally. It contains *ulmin*, gallic acid, and supertartrate of potash.—PROP. Diuretic. It was formerly considered useful in herpetic eruptions, but is now seldom employed.—OFF. PREP. *Decoctum Ulmi.*

UVÆ PASSÆ. *Raisins.*—Vitis vinifera. *Common Vine.* Pentandria Monogynia. *N. O.* Hederaceæ, *L.* Vitis, *J.* Native of Georgia, Armenia, and the Levant; and is now cultivated in several countries. Raisins are either cured by cutting the stalks of the bunches half through when the grapes are almost ripe, which enables the watery part to evaporate, or by gathering the grapes when quite ripe, and dipping them into a ley made from the ashes of the burnt tendrils, and then exposing them to the sun to dry.—PROP. Aperient. They are however not used medicinally, but only officinally in forming some preparations.

UVÆ URSI FOLIA. *Leaves of the Wortleberry.*—Arbutus Uva Ursi. *Bearberry. Bear's Wortleberry.*

Decandria Monogynia. *N. O.* Bicornes, *L.* Ericiniæ, *J.* This shrub is a native of Scotland and the north of Europe. The leaves contain gallic acid, tannin, resin, extractive, and mucilage.—PROP. Astringent. —DOSE, ℈j. to ʒj. powdered.

ZINCUM. *Zinc.*—This metal is found plentifully in England and in most of the mining countries throughout Europe. It occurs in combination with sulphur and iron, when it is called *blende*, or it is found oxidized in combination with silica and carbonic acid. One of its ores, *calamine*, has a place in the Materia Medica. It is obtained from its ores by means of heat, and is brought to market under the name of *speltre*. The density of zinc is about 7; it fuses at 680° F.; and air and moisture have but little action upon it. It is not employed medicinally in its metallic state. — OFF. PREP. *Zinci Oxydum, Zinci Sulphas.*

ZINGIBERIS RADIX. *Root of Ginger.*—Zingiber officinale. *Officinal Ginger.* Monandria Monogynia. *N. O.* Scitamineæ, *L.* Cannæ, *J.* This perennial plant is a native of the East Indies; but it has now become naturalized to the West Indies. The aroma of ginger is owing to a volatile oil; its pungency to a resino-extractive matter. The greatest part of the root consists of starch.—PROP. Stimulant, carminative, sialagogue. Employed chiefly as an adjunct to other medicines.—DOSE, gr. viij. to gr. xv.—OFF. PREP. *Syrupus Zingiberis; Syrupus Rhamni; Tinctura Zingiberis; Tinct. Cinnamomi C.; Confectio Opii; Confect. Scammoneæ; Infusum Sennæ C.; Pulvis Cinnamomi C.; Pulvis Scammoneæ C.; Pulvis Sennæ C.; Pilulæ Scillæ C.; Pilulæ Cambogiæ C.*

PRÆPARATA ET COMPOSITA.

PREPARATIONS AND COMPOUNDS.

ACIDA.

ACIDS.

The acids constitute a numerous and important class of compounds, although few are applied to the purposes of medicine. They may be divided into *mineral*, *vegetable*, and *animal*.

An acid may in general be defined, a body, which, in a state of solution, possesses either a sour taste, or turns vegetable blues, red; and which unites in definite proportions with an alkali, an earth, or with some of the oxides of the ordinary metals forming *salts*. A body, however, which is not sour to the taste, and which does not act upon vegetable blues, may, notwithstanding, be an acid, if it has the property of uniting with bases and forming salts.

If an acid contain oxygen, it is distinguished by the termination *ic*, when its base is combined with the greatest quantity of that element; by the termination *ous*, when the base is united with a less quantity; and the term *hypo* is prefixed to an acid when the base is combined with a quantity below that in either of these;

thus, there are four combinations of sulphur and oxygen, all of which are acid, and are named as follows :—

	Sulphur.		*Oxygen.*
Sulphur*ic* acid	16	+	24
Sulphur*ous* acid	16	+	16
*Hypo*sulphur*ous* acid	32	+	8
*Hypo*sulphur*ic* acid	32	+	40

When the name of an acid terminates in *ic*, the name of the salt which it forms with a base will end in *ate ;* and if the name of an acid ends in *ous*, the name of the salt into which it enters in composition will terminate in *ite :* thus, sulphur*ic* acid with a base forms a sulph*ate ;* sulphur*ous* acid a sulph*ite ; hypo*sulphur*ous* acid a *hypo*sulph*ite*; and *hypo*sulphur*ic* acid a *hypo*sulph*ate.*

Litmus Paper.

Litmus, *archil*, or *turnsole*, is obtained by reducing that species of lichen, called *lichen rocella*, into a powder, by grinding it in a mill, after which it is mixed with half its weight of pearlash, and some human urine : being then exposed to the air, it undergoes fermentation, which is further excited by adding more urine, until it becomes, first of a red, and then of a blue colour, after which it is mixed with a certain quantity of carbonate of potash, and spread out to dry.

Paper stained with tincture of litmus, or the tincture itself, is used as a test for detecting acids in an uncombined state, or combined in excess. The acid changes the blue colour of the paper red. If the redness is occasioned by carbonic acid, the paper regains its original colour on drying, or by exposure to a gentle heat. Water impregnated with sulphuretted hydrogen gas, also produces an evanescent feeble redness with this test. The action of the test may be explained as follows: the red colour of the lichen is changed blue by the above described method of preparation, and on the addition of an acid the alkali is attracted, and the red colour of the vegetable is set free.

It is to be observed, that some salts, which do not contain an excess of acid, redden litmus, from which circumstance an inexperienced person might infer that such salts were *super* or *bi*-salts: thus, nitrate of lead consists of one atom of protoxide of lead and one atom of nitric acid, and is therefore, strictly speaking, a neutral salt; but it has the same action on litmus paper as, for instance, the bisulphate of potash, which consists of one atom of potash, and two atoms of sulphuric acid, and consequently having the acid in excess. Berzelius supposes, that the paper being reddened by some neutral salts is in consequence of the alkali of the litmus having a greater affinity for the acid of such salts than their own bases have, so that the alkali is thus withdrawn, and the red colour of the litmus is restored.

Syrup of violets, paper stained with the juice of the violet flower, or the scrapings of purple radishes, answer the same purpose as litmus paper. Litmus paper should be kept in bottles, and excluded from the air and light.

ACIDUM ACETICUM DILUTUM.

DILUTE ACETIC ACID.

R Recipe congium Aceti;
Take a gallon of vinegar;

Destillet Acidum aceticum dilutum, balneo arenæ,
Let the dilute acetic Acid distil, in a bath of sand,

ex retortâ viterâ in receptaculum vitreum et
from a glass retort into a glass receiver and

frigefactum; tum, primo octario rejecto, serva
made cool; then, the first pint being rejected, keep

octarios sex proximè destillatos.
the six pints next distilled.

It has already been explained under the article *acetum* in the *Mat. Med.*, that common vinegar contains several impurities: to free it from these is the object of the above formula. The first product of the distillation contains a small portion of alcohol, and less acetic acid than that which is afterwards brought over. By carrying on the process too far, the decomposition of the impurities contained in the retort, by destructive distillation, would give rise to empyreuma; the College, therefore, orders the first pint distilled to be rejected, and the last pint to remain in the retort.

Common vinegar after distillation still retains mucilage, and extractive, and is therefore not so eligible for some pharmaceutical purposes as the acetic acid made from wood.

Dilute acetic acid consists of acetic acid and water. The distilled is weaker than the common vinegar. Dry acetic acid is composed of 4 atoms carbon, 3 atoms oxygen, and 2 atoms hydrogen, its atomic weight being 50. With bases it forms salts called *acetates.*

PROP. The same as common vinegar.

OFF. PREP. *Liquor Ammoniæ Acetatis; Liquor Plumbi Subacetatis; Acetum Colchici; Acetum Scillæ; Oxymel simplex; Oxymel Scillæ; Emplastrum Ammoniaci.*

ACIDUM BENZOICUM.

BENZOIC ACID.

Recipe	libram	Benzöini;
Take	*a pound*	*of Benzoin;*

Immitte	Benzöinum	vasi vitreo	imposito
Put	*the Benzoin*	*into a glass vessel*	*placed in*

arenæ,	et	calore	gradûs trecentesimi
sand,	*and*	*a heat*	*of the three hundredth degree*

adhibito	et	aucto	paulatim,	sublima
being applied	*and*	*increased*	*gradually,*	*sublime*

donec	nihil	ampliùs	ascendat;	quod
until	*nothing*	*more*	*rises;*	*that which*

sublimatum est comprime, involutum chartâ bibulâ,
is sublimed compress, folded in blotting-paper,

ut separetur à parte oleosâ; dein
that it may be separated from the oily part; then

sublima iterum, calore non aucto ultra
sublime again, the heat not being increased beyond

gradum quadringentesimum.
the four hundredth degree.

Benzoic acid is composed of 15 atoms carbon, 3 atoms oxygen, 6 atoms hydrogen, and its atomic weight is 120. Its crystals contain no water of crystallization. With bases it forms salts called *benzoates*.

PROP. Stimulant, and expectorant. It is, however, seldom employed alone.—DOSE, gr. x. to ℈j.

OFF. PREP. *Tinctura Camphoræ composita.*

ACIDUM CITRICUM.

CITRIC ACID.

Recipe octarium Succi Limonum; unciam
Take a pint of the Juice of Lemons; an ounce

Cretæ præparatæ, vel quantum sit satis
of prepared Chalk, or as much as may be sufficient

ad saturandum Succum; fluid-uncias novem
to saturate the Juice; nine fluid-ounces

Acidi sulphurici diluti;
of diluted sulphuric Acid;

Adjice Cretam paulatim Succo Limonum
Add the Chalk gradually to the juice of Lemons

fervefacto, et misce; tum effunde liquorem.
made hot, and mix; then pour off the liquor.

Ablue Citratem Calcis, quæ remanet,
Wash the Citrate of Lime, which remains,

aquâ tepidâ sæpiùs renovatâ; dein sicca.
with tepid water often renewed; then dry.

Tum superinfunde acidum sulphuricum dilutum
Then pour the diluted sulphuric acid

pulveri exsiccato, et coque per sextam partem
to the dried powder, and boil for the sixth part

horæ. Exprime liquorem fortiter per linteum,
of an hour. Express the liquor strongly through linen,

et cola per chartam. Consume colatum
and strain through paper. Evaporate the strained [liquor]

leni calore, adeò ut, dum frigescit, crystalli
with a gentle heat, so that, whilst it cools, crystals

fiant. Liqua crystallos iterum et
may be formed. Dissolve the crystals again and

tertiò in aquâ, ut sint puræ, que
a third time in water, that they may be pure, and

cola eam toties; decoque et
strain it (i. e. *the solution*) *as often; boil down and*

sepone.
set (*it*) *aside.*

The citric acid of the lemon juice unites with the lime of the chalk forming *citrate of lime*, which is insoluble, and the carbonic acid of the chalk escapes in the form of *gas*. The citrate of lime being washed to free it from mucilage and extractive matter, is then decomposed by adding sulphuric acid; this combines with the lime forming *sulphate of lime*, which is insoluble, and the *citric acid* being set free and held in solution is afterwards crystallized: and by repeated solution and crystallization the crystals are obtained colourless.

Dry citric acid is composed of 4 atoms carbon, 4 atoms oxygen, and 2 atoms hydrogen, its own atomic weight being 58. In its crystallized state it contains 2 atoms of water. It forms salts, with bases called *citrates.*

Prop. The same as lemon juice, a substitute for which may be made by dissolving about ʒx. of the crystals in Oj. of water. Citric acid is often employed for the purpose of forming effervescing draughts with alkaline carbonates.

ACIDUM MURIATICUM.

MURIATIC ACID.

Recipe *Take*	libras duas *two pounds*	Muriatis exsiccatæ *of dried Muriate*	Sodæ; *of Soda;*
uncias viginti *twenty ounces*	(pondere) *(by weight)*	Acidi sulphurici; *of sulphuric Acid;*	
octarium *a pint*	cum semisse *with half (a pint)*	Aquæ destillatæ; *of distilled Water;*	

Priùs *First*	misce *mix*	Acidum *the Acid*	cum octario dimidio *with half a pint*

Aquæ *of the Water*	in retortâ vitreâ, *in a glass retort,*	et *and*	his, *to these,*	ubi *when*
refrixerint, *they shall have cooled,*	adjice *add*	Muriatem *the Muriate*	Sodæ. *of Soda.*	
Infunde *Pour*	quod *that which*	reliquum est *is left*	Aquæ *of the Water*	
in receptaculum; *into a receiver;*	tum, *then,*	retortâ aptatâ, *the retort being fitted,*		
transeat Acidum muriaticum *let the muriatic Acid pass over*	destillatum *distilled*	ex balneo *from a bath*		

arenæ	in hanc aquam,	calore	aucto
of sand	*into this water,*	*the heat*	*being increased*

gradatim,	donec	retorta	rubescat.
gradually,	*until*	*the retort*	*grows red.*

Pondus specificum	Acidi muriatici	est
The specific gravity	*of muriatic Acid*	*is*

ad pondus specificum	Aquæ destillatæ,	ut
to the specific gravity	*of distilled water,*	*as* 1.160

ad	[mille	centum	et	sexaginta
to 1.000	[*one thousand*	*one hundred*	*and*	*sixty*

(partes	sunt)	ad mille	(partes)].
(*parts*	*are*)	*to one thousand*	(*parts*)].

Grana centum viginti quatuor,	Crystallorum
A hundred and twenty-four grains,	*of the crystals*

Subcarbonatis	Sodæ	saturantur
of the Subcarbonate	*of Soda*	*are saturated*

ab granis centum	hujus acidi.
by a hundred grains	*of this acid.*

Common salt is composed of chlorine and sodium, and when acted upon by sulphuric acid the following changes take place:—the water of the sulphuric acid is decomposed; its oxygen uniting with the sodium forms *soda*, which combines with the sulphuric acid and forms *sulphate of soda;* and the chlorine uniting with the hydrogen of the water forms *muriatic acid gas*, which passes over, and is condensed by the water in the receiver, the sulphate of soda with excess of sulphuric acid remaining in the retort.

Before it was discovered that chlorine is a simple body, common salt was regarded as a muriate of soda, and when acted upon by sulphuric acid, it was explained, that the sulphuric acid unites with the soda forming *sulphate of soda*, and that the *muriatic acid* being set free passes into the receiver in a gaseous form, and is condensed by the water.

Muriatic acid gas consists of equal volumes of chlorine and hydrogen gases, which may be made to combine without condensation of volume, by means of heat, light, or electricity; by weight it consists of 1 atom chlorine, and 1 atom hydrogen, its atomic weight being 37. This gas is colourless, it has a suffocating smell, and is destructive of life and combustion. It is highly absorbable by water, and must therefore be collected over mercury.

The sp. gr. of the liquid acid is stated by the College at 1.160, but we meet with samples of different degrees of density: the manner of ascertaining the quantity of real acid in any sample is shewn in another part of this work. This acid is also called *hydrochloric acid*, a name which bespeaks its composition. Its salts are *muriates*, or *hydrochlorates*.

PROP. Tonic, antiseptic, lithontriptic.—DOSE, ♏x. to ♏xx. properly diluted. It is also employed locally in gargles, in ulcerated sore throats. The gas, which may be readily generated by pouring sulphuric acid on common salt, is used as a disinfecting agent in apartments containing impure air.

OFF. PREP. *Tinctura Ferri Muriatis; Ferrum ammoniatum.*

ACIDUM NITRICUM.

NITRIC ACID.

Recipe Nitratis exsiccatæ Potassæ;
Take of dried Nitrate of Potash; (and)

Acidi sulphurici, singulorum libras duas
of sulphuric Acid, of each two pounds

(pondere);
(by weight);

Misce in retortâ vitreâ; tum distillet Acidum nitricum
Mix in a glass retort; then let the nitric Acid distil

balneo arenæ, donec vapor ruber prodeat.
in a bath of sand, until a red vapour be produced.

Dein, adjectâ insuper unciâ Nitratis exsiccatæ
Then, having cast thereon an ounce of dried Nitrate

Potassæ, Acidum destillet iterum eodem modo.
of Potash, let the Acid distil again in the same manner.

Pondus specificum Acidi nitrici est
The specific gravity of nitric Acid is

ad pondus specificum Aquæ destillatæ ut
to the specific gravity of distilled water as 1.500

ad [mille, quingentæ (partes sunt)
to 1.000 [*one thousand, five hundred* (*parts are*)

ad mille (partes)].
to one thousand (*parts*)].

Grana ducenta duodecim Crystallorum
Two hundred and twelve grains of the crystals

Subcarbonatis Sodæ saturantur
of the Subcarbonate of Soda are saturated

ab granis centum hujus acidi.
by a hundred grains of this acid.

Nitrate of potash consists of dry nitric acid and potash; liquid sulphuric acid of dry sulphuric acid and water. The dry sulphuric acid unites with the potash of the nitrate forming *bisulphate of potash*, and the dry nitric acid combines, and is brought over by distillation, with the water of the sulphuric acid.

Sulphuric acid requires only 1 atom of water to exist in the liquid state, while nitric acid requires 2 atoms of water to become liquid: the sulphuric acid is therefore added in excess, and, consequently, a *bisulphate* remains in the retort.

In the above formula the acid is ordered to be redistilled, nitrate of potash being previously added to it: the object is to remove any sulphuric acid that might be brought over in the first distillation. It is not, however, necessary to observe this direction as the nitric acid is procured at first unadulterated with the sulphuric.

Dry nitric acid is composed of 1 atom azote, and 5 atoms oxygen, its weight of atom being 54. By *dry* nitric acid is meant, the acid as it exists when combined with a base without water, as in the dry nitrates. This acid does not exist in the state of gas.

The sp. gr. of liquid nitric acid when of the greatest strength is 1.500. 1 atom of the acid requires 2 atoms of water for its condensation, but it will unite with any additional quantity of water, and, consequently, we meet with samples of different strengths.

PROP. Nitric acid is not used internally in its strong form:—See *Acid. Nitric. dilut.* It is employed externally in sloughing phagadenic ulcers as an escharotic. The ulcer should be first well cleaned, dried, and surrounded with a coating of lard, to prevent the acid spreading to the healthy parts, and then the strong acid may be applied. Nitric acid vapour, like muriatic acid gas, is employed to counteract contagion: a very small quantity of the ingredients will be sufficient to generate it for ordinary purposes.

OFF. PREP. *Acidum nitricum dilut.; Argenti Nitras; Bismuthi Subnitras; Liquor Ferri alkalini; Hydrargyri Nitrico-oxydum; Spiritus Ætheris nitrici; Unguentum Hydrargyri Nitratis.*

ACIDUM NITRICUM DILUTUM.

DILUTED NITRIC ACID.

Recipe fluidunciam Acidi nitrici; fluiduncias novem
Take a fluid-ounce of nitric Acid; nine fluid-ounces

Aquæ destillatæ; Misce.
of distilled water; Mix.

PROP.—Tonic, antiseptic. Externally, it is employed as a stimulant in cases of fœtid ulcers in the proportion of f℥ij. to Oj. of water.—DOSE, ♏x. to ♏xxx. properly diluted with water.

ACIDUM SULPHURICUM DILUTUM.

DILUTED SULPHURIC ACID.

Recipe fluidunciam cum semisse Acidi sul-
Take a fluid-ounce with half (an ounce) of sulphuric

phurici; fluiduncias quatuordecim cum
Acid; fourteen fluid-ounces with

semisse Aquæ destillatæ;
half (an ounce) of distilled Water;

Adjice Acidum Aquæ paulatim;
Add the Acid to the Water by little and little;

tum misce.
then mix.

When sulphuric acid and water are added together condensation of volume takes place; that is, the two liquids after combination occupy less space than when in their separate states; and as sulphuric acid and water have less affinity for caloric after condensation, heat is evolved, or, in other words, a portion of their latent heat is given out, and becomes sensible heat. This is more or less the result of the combination of all fluids that unite chemically.

PROP.—Astringent, refrigerant, tonic. DOSE, ♏. vj. to f℥ss. diluted with water.

ACIDUM TARTARICUM.

TARTARIC ACID.

Recipe libras duas cum semisse Super-
Take two pounds with half (a pound) of the Super-

tartratis Potassæ; congios tres Aquæ destillatæ fer-
tartrate of Potash; three gallons of boiling distilled

ventis; libram Cretæ preparatæ; libram
Water; a pound of prepared Chalk; a pound

Acidi sulphurici;
of sulphuric Acid;

Coque Supertartratem Potassæ cum
Boil the Supertartrate of Potash with

congiis duobus Aquæ destillatæ, et adjice paulatim
two gallons of distilled Water, and add gradually

Cretam præparatam, donec bullulæ non ampliùs
the prepared Chalk, until bubbles no more

excitentur: sepone ut Tartras Calcis
are excited: set aside that the Tartrate of Lime

subsidat: effunde liquorem, et ablue Tartratem
may subside: pour off the liquor, and wash the Tartrate

Calcis sæpiùs Aquâ destillatâ, donec
of Lime frequently with distilled Water, until

sit expers saporis. Tum superinfunde
it be devoid of taste. Then pour thereon

Acidum sulphuricum, dilutum congio
the sulphuric Acid, diluted with a gallon

Aquæ destillatæ ferventis, et sepone per
of boiling distilled Water, and set (it) aside for

horas viginti quatuor, agitans subindè. Cola
twenty-four hours, shaking (it) frequently. Strain

liquorem, et consume balneo aquoso ut
the liquor, and evaporate (it) in a water bath that

crystalli fiant.
crystals may be formed.

Supertartrate of potash consists of 2 atoms tartaric acid, and 1 atom potash. The superabundant acid unites with the lime of the chalk, and expels the carbonic acid in the state of *gas*, and *tartrate of lime*, which is insoluble, is formed: *tartrate of potash* is held in solution, and is to be poured off. The tartrate of lime is then decomposed by adding sulphuric acid; *sulphate of lime*, which is insoluble, is formed, and the *tartaric acid*, being set free, is held in solution, and afterwards crystallized.

Dry tartaric acid is composed of 5 atoms oxygen, 2 atoms hydrogen, and 4 atoms carbon, its atomic weight being 66. In the crystallized state it contains 1 atom of water. It forms salts with bases called *tartrates*.

PROP.—Refrigerant. It is employed as a substitute for citric acid in forming effervescing draughts with the alkaline carbonates, being less expensive.—DOSE, gr. x. to ʒss.

*** The other acids which are used medicinally, or which require to be noticed, will be found by turning to the index.

ALKALIA ET EORUM SALES.

ALKALIES AND THEIR SALTS.

Alkalies are known by turning vegetable blues, green, and vegetable yellows, brown. They unite with acids, and form salts.

Turmeric Paper.

Paper stained with the tincture of the root of *turmeric*,* is an excellent test for discovering the presence of alkalies. The yellow colour of the paper is changed to a brick-red, or orange, by alkalies, whether in a caustic state, or combined with carbonic acid, but it is

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* Curcuma longa, *Turmeric.*— Monandria Monogynia, *N. O.* Scitamineæ, *L.* Drymyrrhizæ, *J.*—Cultivated throughout India for the sake of the root. Considered by the Hindoos, a stomachic, and is an essential ingredient of their curries. The root contains a peculiar colouring principle.

not affected by carbonated earths; so that by this test we are at once enabled to distinguish the presence of a carbonated alkali from that of a carbonated earth, when held in solution by an excess of carbonic acid.

By means of this test the exact point of neutralization of some acids with alkalies may be ascertained with great nicety. It is, however, to be borne in mind, that it does not at all times serve as a criterion by which we can judge of the neutrality of a compound; because, as just observed, it is acted upon by carbonated alkalies, which consist of 1 atom of acid, and 1 atom of base, and are therefore in strict terms neutral bodies. It is even acted upon by bicarbonated alkalies, and in consequence a deficiency of acid in such compounds might be supposed to exist by those who are unacquainted with the application of this test. Accordingly, we find *carbonate of soda*, and *carbonate of potash*, as well as the *sesquicarbonate of ammonia*, called in the Pharmacopœia, and in the older works on chemistry, *subcarbonates*.

Turmeric paper changed by alkalies, has its original yellow colour restored by acids; and litmus paper changed by acids, has its original blue colour restored by alkalies.

AMMONIÆ SUBCARBONAS.

SUBCARBONATE OF AMMONIA.

Recipe libram Muriatis Ammoniæ; libram
Take a pound of the Muriate of Ammonia; a pound

cum semisse Cretæ preparatæ exsiccatæ;
with half (a pound) of prepared Chalk dried;

Tere in pulverem separatim; tum misce,
Rub (them) into a powder separately; then mix,

et sublima, calore aucto paulatim, donec
and sublime, the heat being increased gradually, until

retorta rubescat.
the retort grows red.

Muriate of ammonia is composed of muriatic acid and ammonia, and chalk of carbonic acid and lime. Muriatic acid consists of chlorine and hydrogen, and lime of oxygen and calcium. During the process, the carbonic acid of the chalk unites with some ammonia of the muriate, forming *carbonate of ammonia*, and the oxygen of the lime unites with the hydrogen of the muriatic acid, forming *water*, which rises in the state of vapour, and is condensed with the carbonate of ammonia. The calcium of the lime unites with the chlorine of the muriatic acid, and forms *chloride of calcium*, which remains in the retort.

The theory of the process was formerly explained by saying, that the muriatic acid of the muriate unites with the lime of the chalk, forming *muriate of lime*, while the carbonic acid of the chalk unites with the ammonia of the muriate, forming *carbonate of ammonia.*

In strict chemical language, this salt is a *hydrated sesqui*carbonate, being composed of $1\frac{1}{2}$ atom carbonic acid, 1 atom ammonia, and 1 atom water. In expressing the composition of this and similar compounds, it is customary to double the numbers, so as to avoid the fraction, thus:—

2 atoms Ammonia	....	$17 \times 2 = 34$
3 —— Carbonic Acid	....	$22 \times 3 = 66$
2 —— Water	....	$9 \times 2 = 18$
		118

The carbonic acid and ammonia contained in the ingredients employed are in the proper proportions for forming *carbonate* of ammonia, and the reason that only a *sesqui*carbonate results from the process, is, that part of the ammonia is expelled by the heat in a free state.

This salt is converted into *hydrated bi*carbonate by exposure to the air, in consequence of its parting with ammonia. Bicarbonate of ammonia is destitute of smell. There are three compounds of carbonic acid and ammonia, viz., the carbonate, sesquicarbonate, and bicarbonate.

PROP.—Antacid, stimulant, antispasmodic, and emetic in large doses. It is employed in syncope, &c., under the form of smelling salts.—DOSE, gr. v. to gr. xij.

OFF. PREP.—*Liquor Ammoniæ Subcarbonatis ; Liquor Ammoniæ Acetatis ; Linimentum Ammoniæ Subcarbonatis ; Cuprum Ammoniatum.*

LIQUOR AMMONIÆ.
SOLUTION OF AMMONIA.

Recipe uncias octo Muriatis Ammoniæ ;
Take eight ounces of the Muriate of Ammonia;

uncias sex Calcis recentis; octarios quatuor
six ounces of fresh Lime ; four pints

Aquæ ;
of Water ;

Superinfunde octarium Aquæ Calci ;
Pour a pint of the Water to the Lime ;

tum contege vas, et sepone per horam ;
then cover the vessel, and set (it) aside for an hour ;

dein adjice Muriatem Ammoniæ et
then add the Muriate of Ammonia and

reliquam Aquam priùs fervefactam, et contege
the remaining Water first made hot, and cover

vas iterum ; cola liquorem postquam
the vessel again ; strain the liquor after

refrixerit ; tum destillent fluidunciæ duodecim,
it shall have cooled ; then let twelve fluid-ounces distil,

Liquoris Ammoniæ in receptaculum, calor
of the solution of Ammonia into a receiver, the heat

cujus non superet gradum quinquagesimum.
of which does not exceed the fiftieth degree.

Pondus specificum Liquoris Ammoniæ est
The specific gravity of the solution of Ammonia is

ad pondus Aquæ destillatæ ut ad
to the gravity of distilled Water as 0.960 *to* 1.000—

[nongentæ et sexaginta (partes sunt) ad mille
[*nine hundred and sixty* (*parts are*) *to one thousand*

(partes)].
(*parts*)].

The lime unites with the muriatic acid of the muriate of ammonia, and *muriate of lime* is formed, and the *ammonia* being set free is held in solution by the water along with the muriate of lime. By distillation, the ammonia, which is volatile, passes over with part of the water, and the muriate of lime, which is not volatile, remains in the retort.

By employing the same ingredients in a dry state, ammonia is obtained in a gaseous form, and may be collected over mercury. Ammoniacal gas is invisible, its smell is powerfully pungent and peculiar, it is destructive of life, but is agreeably stimulant when diluted with atmospheric air; it destroys flame, is condensed very readily by water, which takes up about 780 times its volume, and under a pressure of 6.5 atmospheres, becomes a transparent colourless liquid. Ammonia consists of 3 atoms hydrogen, and 1 atom azote, its atomic weight being 17. Its elements cannot be made to unite *synthetically*. Ammonia in a gaseous state, or in solution, is recognized by its alkaline properties; but turmeric paper, changed by it, has its colour restored on exposure to the air. Ammonia is sometimes called the *volatile alkali*. All its salts are either decomposed at a red heat, or dissipated in vapour.

PROP.—*Liquor ammoniæ* is a diffusible stimulant, and antacid. Externally, it is rubefacient. As a local stimulant it may be applied to the nostrils in faintings, but care should be taken not to pour it in the mouth when the patient is in a recumbent position. The *ammoniæ subcarbonas* is a better form of application to the nostrils in syncope, and, to make it stronger, it may be moistened with the *liquor ammoniæ.*—DOSE, ♏x. to ♏xx. properly diluted with water.

OFF. PREP.—*Linimentum Ammoniæ; Spiritus Ammoniæ succinatus; Linimentum Camphoræ comp; Linimentum Hydrargyri.*

LIQUOR AMMONIÆ ACETATIS.

SOLUTION OF ACETATE OF AMMONIA.

Recipe uncias duas Subcarbonatis Ammoniæ;
Take two ounces of the Subcarbonate of Ammonia;

octarios quatuor Acidi acetici diluti, vel quantum
four pints of dilute acetic Acid, or as much as

sit satis;
may be sufficient;

Adjice Acidum Subcarbonati Ammoniæ,
Add the Acid to the Subcarbonate of Ammonia,

donec bullulæ excitentur non ampliùs, et misce.
until bubbles are excited no longer, and mix.

The acetic acid unites with the ammonia of the subcarbonate, forming *acetate of ammonia*, and the carbonic acid is expelled in the form of *gas*.—This compound is generally prepared in a very careless manner, and either the acid or alkali prevails. Instead of employing the ingredients in the proportions named in the above formula, it will be better to ascertain the point of neutrality by litmus and turmeric paper, as the dilute acetic acid is liable to vary in strength. The litmus paper, however, may be acted upon when the whole of the acetic acid is neutralized, in consequence of some carbonic acid being in the solution, but this is easily ascertained, because litmus paper reddened by carbonic acid has its colour restored by holding it to the fire.

Prop.—Diaphoretic. Its action is assisted by antimonials, opium and camphor; diluents should also be employed along with external heat during its exhibition, for when the patient is exposed to a cool atmosphere it is apt to act upon the kidneys, and pass off by urine. Externally it is discutient. When properly prepared, diluted with water, and combined with tinctura opii, it forms a good collyrium in chronic opthalmia; and still further diluted, it may be employed as an injection in gonnorrhœa.—Dose, f℈iv. to f℥iss.

LIQUOR AMMONIÆ SUBCARBONATIS.

SOLUTION of SUBCARBONATE of AMMONIA.

Recipe uncias quatuor Subcarbonatis Ammoniæ;
Take four ounces of the Subcarbonate of Ammonia;

octarium Aquæ destillatæ;
a pint of distilled Water;

Liqua Subcarbonatem Ammoniæ in Aquâ,
Dissolve the Subcarbonate of Ammonia in the Water,

et cola per chartam.
and strain through paper.

Prop.—The same as those of the salt in a solid form. Dose, f℈ss. to f℈j. in any proper liquid.

In the shops we meet with a preparation analogous to the above, termed *hartshorn*, for the formation of which there is a formula in the *Dublin Pharmacopœia*. The process consists in subjecting hartshorn or bones, to destructive distillation in a retort. The gelatine of the horns or bones, which consists of oxygen, hydrogen, carbon, and azote, is decomposed: oxygen and carbon re-uniting form *carbonic acid*, and hydrogen and azote form *ammonia*, which together give rise to *carbonate of ammonia*. Empyreumatic oil, water, &c. are also produced during the process. The carbonate of ammonia is produced in a solid form, and in solution in water: the latter distils over. In both states it is contaminated with the empyreumatic oil, which may be removed by repeated distillation with charcoal. It is, however, seldom found in the shops entirely free from empyreumatic oil.

LIQUOR POTASSÆ.

SOLUTION OF POTASH.

Recipe libram Subcarbonatis Potassæ;
Take a pound of the Subcarbonate of Potash;

libram dimidiam Calcis recentis; congium
half a pound of fresh Lime; a gallon

Aquæ destillatæ ferventis;
of boiling distilled Water;

Liqua Potassam in octariis duobus
Dissolve the Potash in two pints

Aquæ. Adjice quod reliquum est
of the Water. Add that which is left

Aquæ Calci. Misce liquores calentes
of the Water to the Lime. Mix the heated liquors

inter se, tum sepone in vase clauso, et,
together, then set aside in a covered vessel, and,

postquam refrixerint, cola per
after they shall have cooled, strain through

pannum gossipinum.
cotton cloth.

Si Acidum dilutum quodlibet instillatum excitet
If any diluted Acid dropped in excite

bullulas, oportebit adjicere plus
bubbles, it will be necessary to add more

Calcis, et colare iterum.
Lime, and to filter again.

Octarius hujus Liquoris debet pendere
A pint of this Liquor ought to weigh

uncias sedecim.
sixteen ounces.

The lime abstracts the carbonic acid from the subcarbonate of potash, and *carbonate of lime*, which is insoluble is formed, and the *potash* is held in solution by the water.

Although, by the above method, a solution of potash is obtained sufficiently pure for medical purposes, yet it is not altogether free from carbonic acid, and it likewise contains other impurities.

PROP.—Antacid, and lithontriptic in those cases where uric acid is secreted in excess, which is known by a red sediment in the urine; it should not be administered when the sediment is white, but the muriatic acid will then be found serviceable in correcting the tendency to calculus. It is an useful remedy in those diseases of the skin which arise from acidity of the primæ viæ.—DOSE, ♏x. to fʒj. in veal broth, or some bitter infusion.

OFF. PREP.—*Potassa fusa; Potassa cum Calce; Antimonii Sulphuretum præcipitatum.*

LIQUOR POTASSÆ SUBCARBONATIS.

SOLUTION OF SUBCARBONATE OF POTASH.

Recipe libram Subcarbonatis Potassæ;
Take a pound of the Subcarbonate of Potash;

fluiduncias duodecim Aquæ destillatæ;
twelve fluid-ounces of distilled Water;

Liqua Subcarbonatem Potassæ in Aquâ,
Dissolve the Subcarbonate of Potash in the Water,

et cola per chartam.
and strain through paper.

The medical properties of this solution are the same as those of the salt in its solid form.—DOSE, from ♏x. to fʒij. in any proper vehicle.

POTASSA CUM CALCE.

POTASH WITH LIME.

Recipe octarios tres Liquoris Potassæ;
Take three pints of the solution of Potash;

libram Calcis recentis;
a pound of fresh Lime;

Decoque Liquorem Potassæ ad octarium;
Boil down the solution of Potash to a pint;

dein adjice Calcem, resolutam Aquâ
then add the Lime, slaked by Water

affusâ, et diligenter misce.
being poured thereon, and diligently mix.

This is a mechanical mixture of lime and potash. The lime renders the potash less deliquescent and more manageable as an escharotic. It should be kept excluded from the air. Confined to external use.

POTASSA FUSA.

FUSED POTASH.

Recipe congium Liquoris Potassæ;
Take a gallon of the solution of Potash;

Consume Aquam in vase ferreo nitido
Evaporate the Water in a clean iron vessel

ad ignem, donec, ebullitione finitâ,
upon the fire, until, the ebullition being finished,

Potassa liquefiat: effunde hanc
the Potash becomes melted: pour off this

super laminam ferream in formas idoneas.
upon an iron plate into convenient shapes.

Fused potash consists of 1 atom potassium, 1 atom oxygen, and 1 atom water, and is therefore a *hydrate.** It retains its water so powerfully, that it cannot be separated by the most intense heat. This preparation should be kept excluded from the air, otherwise it will attract water and carbonic acid.

PROP.—It is employed externally as a caustic. The internal use of potash is explained under *Liquor Potassæ.*

POTASSÆ ACETAS.

ACETATE OF POTASH.

Recipe libram Subcarbonatis Potassæ;
Take a pound of the Subcarbonate of Potash;

octarios duos Acidi acetici fortioris; octarios
two pints of the stronger acetic Acid; two

duos Aquæ destillatæ ferventis;
pints of boiling distilled Water;

Adjice Acidum priùs commixtum cum Aquâ
Add the Acid first mixed with the Water

Subcarbonati Potassæ, donec bullulæ
to the Subcarbonate of Potash, until bubbles

non ampliùs excitentur, et cola. Consume
no longer are excited, and strain. Evaporate

liquorem primò in balneo aquoso donec
the liquor first in a water-bath until

ebullitio cessaverit. Dein expone
ebullition shall have ceased. Then expose (it)

calori gradatim aucto, et consume
to a heat gradually increased, and evaporate (it)

---

* *Hydrates* are bodies containing water in definite proportions, and are consequently chemical compounds.

iterum donec pellicula supernatet; exsicca
again until a pellicle swims on the top; dry

pelliculam ablatam super chartam bibulam.
the pellicle taken off upon bibulous paper.

Consumatur liquor iterum et sæpiùs,
Let the liquor be evaporated again and frequently,

et aufer pelliculam, et exsicca
and take off the pellicle, and dry (it)

eodem modo.
in the same manner.

The acetic acid combines with the potash of the subcarbonate, forming *acetate of potash*, in solution, and the carbonic acid is expelled in the form of *gas*.

By employing the acetic acid obtained from wood, a whiter salt is procured than would result from substituting distilled vinegar, on account of the mucilage which the latter contains.

This salt does not readily crystallize, but when procured as above, it assumes a foliated texture. It is composed of 1 atom acetic acid, and 1 atom potash. Deliquescent.

Prop.—Mildly aperient, in doses of ʒij. to ʒiij.; diuretic, in doses of ℈j. to ʒj. It is said not to be diuretic without being combined with adjuvants.

POTASSÆ CARBONAS.

CARBONATE OF POTASH.

Recipe congium Liquoris Subcarbonatis
Take a gallon of the solution of the Subcarbonate

Potassæ;
of Potash;

Transmitte Acidum carbonicum per Liquorem
Pass carbonic Acid through the solution

Subcarbonatis Potassæ in vase idoneo
of the Subcarbonate of Potash in a proper vessel

ad plenam saturationem, et cola.
to a full saturation, and strain.

Vaporet liquor colatus ut crystalli
Let the strained liquor evaporate that crystals

fiant, cavendo ne calor
may be formed, taking care lest the heat

excedat gradum centesimum vigesimum.
should exceed the hundred and twentieth degree.

Liquore effuso, exsicca has
The liquor being poured off, dry these

super chartam bibulam.
upon blotting paper.

Acidum carbonicum obtinetur facillimè
Carbonic Acid is obtained most easily

è Marmore albo et Acido sulphurico diluto.
from white Marble and dilute sulphuric Acid.

When the marble, which is composed of 1 atom carbonic acid, and 1 atom lime, is acted upon by the sulphuric acid, *sulphate of lime* is formed, and the *carbonic acid* escapes in the state of *gas*, and is received into the solution of subcarbonate of potash. It is to be remembered that what is called a *sub*carbonate of potash by the College, is a *carbonate*, consisting of 1 atom of acid and 1 atom of base. By passing a stream of carbonic acid gas through a solution of it, the potash combines with another atom of carbonic acid, and a *bi*carbonate of potash is formed.

In evaporating the liquor previous to crystallization, the heat is ordered not to exceed 120°, lest part of the carbonic acid should be driven off by too high a temperature.

The College is wrong in stating that marble is decomposed *most easily* by sulphuric acid, because the *sulphate of lime* which is formed, being insoluble, envelopes the undecomposed marble, and prevents the further action of the acid upon it, unless agitation be resorted to so as to displace the sulphate. This acid is probably ordered for the sake of economy. Muriatic acid, which is now much cheaper than formerly, may be substituted for the sulphuric; its action on the marble proceeds without interruption until it becomes neutralized, the *muriate of lime* formed being soluble.

This salt consists of 2 atoms carbonic acid, and 1 atom potash. In its crystallized state it contains 1 atom of water. Its crystals are permanent when exposed to the air.

Prop.—The same as those of the *subcarbonate of potash*, but it is less nauseous than that salt on account of the excess of carbonic acid which it contains.—Dose, gr. xv. to ʒj.

POTASSÆ SUBCARBONAS.

SUBCARBONATE OF POTASH.

Recipe libras tres Potassæ impuræ contritæ;
Take three pounds of impure Potash powdered;

octarios tres Aquæ ferventis cum semisse;
three pints of boiling Water with half (a pint);

Liqua Potassam in Aquâ, et cola;
Dissolve the Potash in the Water, and strain;

tum effunde in vas ferreum nitidum, et
then pour off into a clean iron vessel, and

consume Aquam lento igne, ut liquor
evaporate the Water with a slow fire, that the liquor

spissescat; dein, igne subducto,
may grow thick; then, the fire being removed,

move assiduè spathâ ferreâ,
stir (the liquor) constantly with an iron spatula,

donec Sal abeat in grana parvula.
until the Salt forms in small grains.

Subcarbonas Potassæ potest præparari
Subcarbonate of Potash may be prepared

eodem modo		ex Tartaro,		quod
in the same manner		*from Tartar,*		*which*
fuerit	priùs	ustum	donec	sit
shall have been	*first*	*burnt*	*until*	*it be*

cinerei coloris.
of an ashy colour.

By solution and filtration the *potassa impura* of the *materia medica* (which is *impure carbonate of potash*) is in a great measure freed from its impurities.

By burning tartar, which is *impure supertartrate of potash*, the tartaric acid of the salt is decomposed and converted into *carbonic acid*, which uniting with the potash forms carbonate of potash.

It has already been observed when speaking of the action of alkalies on turmeric paper, page 91, that on account of the alkaline re-action of some salts, the base was supposed to be in excess, and therefore the term *sub* was employed to designate their composition. It was from this circumstance that the salt in question received the name of *sub*carbonate, but it is in reality a *carbonate*, being composed of 1 atom carbonic acid, and 1 atom potash.

This salt is highly deliquescent, and ought therefore to be kept excluded from the air.

Prop.—The medical properties of this salt are similar to those enumerated under *Liquor Potassæ*, but it is of course milder than that preparation on account of the carbonic acid which it contains. It is principally used medicinally for the formation of saline draughts, with citric acid or lemon juice, in the proportion of ℈j. of the salt to fʒiv. of the lemon juice.—Dose, gr. x. to ʒss.

Off. Prep.—*Liquor Potassæ Subcarbonatis; Liquor Potassæ; Potassæ Acetas; Potassæ Sulphas; Potassæ Tartras; Magnesiæ Subcarbonas; Potassæ Sulphuretum; Alcohol; Liquor Arsenicalis; Liquor Ferri Alkalini; Hydrargyrum præcipitatum album; Spiritus Ammoniæ; Spiritus Ammoniæ aromaticus; Decoctum Aloes, C.: Mistura Ferri, C.*

POTASSÆ SULPHAS.

SULPHATE OF POTASH.

Recipe Salis qui restat post destillationem
Take of the Salt which remains after the distillation

Acidi nitrici libras duas; Aquæ ferventis
of nitric Acid two pounds; of boiling Water

congios duos;
two gallons;

Misce, ut Sal liquetur; tum
Mix, that the Salt may be dissolved; then

adjice Subcarbonatis Potassæ quod
add of the Subcarbonate of Potash that which

sit satis ad saturandum Acidum.
may be sufficient to saturate the Acid.

Dein coque donec pellicula supernatet,
Then boil until a pellicle swims upon (the top),

et, ubi colaveris, sepone, ut
and, when you shall have strained (it), set (it) aside, that

crystalli fiant. Effuso liquore,
crystals may be formed. Having poured off the liquor,

exsicca has super chartam bibulam.
dry these upon bibulous paper.

The salt remaining after the distillation of nitric acid is a *bi*sulphate of potash; by adding to this in solution subcarbonate of potash, the potash of the latter salt combines with the excess of acid in the bisulphate, and reduces it to a neutral *sulphate*, and the carbonic acid of the carbonate is expelled in the form of *gas*.

Sulphate of potash, in its crystallized state, contains no water of crystallization. Its crystals are permanent when exposed to the air.

Prop. Deobstruent, and carthartic. Its aperient properties are improved by combining it in a state of powder with rhubarb, or aloes.—Dose, gr. x. to ʒiij., or more.

Off. Prep. *Pulvis Ipecacuanhæ comp.*

POTASSÆ SUPERSULPHAS.

SUPERSULPHATE OF POTASH.

Recipe Salis qui restat post destillationem
Take of the Salt which remains after the distillation

Acidi nitrici libras duas; Aquæ ferventis
of nitric Acid two pounds; of boiling Water

octarios quatuor;
four pints;

Misce, ut Sal liquetur, et cola.
Mix, that the Salt may be dissolved, and strain.

Dein coque ad dimidium, et sepone, ut
Then boil to half, and set (it) aside, that

crystalli fiant. Effuso liquore,
crystals may be formed. The liquor being poured off,

exsicca has super chartam bibulam.
dry these upon bibulous paper.

This is merely the bisulphate of potash, left in the retort after making nitric acid, washed and crystallized.

The crystals contain 2 atoms of water.

Prop. The same as the sulphate of potash, but more active, being more soluble.—Dose, gr. x. to ʒij.

POTASSÆ TARTRAS.

TARTRATE OF POTASH.

Recipe uncias sedecim Subcarbonatis Potassæ;
Take sixteen ounces of the Subcarbonate of Potash;

libras tres Supertartratis Potassæ; congium
three pounds of the Supertartrate of Potash; a gallon

Aquæ ferventis;
of boiling Water;

Liqua Subcarbonatem Potassæ in Aquâ;
Dissolve the Subcarbonate of Potash in the Water;

tum adjice Supertartratem Potassæ tritam in
then add the Supertartrate of Potash rubbed into

pulverem, donec bullulæ non ampliùs excitentur.
a powder, until bubbles no longer are excited.

Cola liquorem per chartam; dein coque
Strain the liquor through paper; then boil

donec pellicula supernatet, et sepone,
until a pellicle swims upon (the top), and set aside,

ut crystalli fiant. Effuso liquore,
that crystals may be formed. The liquor being poured off,

exsicca has super chartam bibulam.
dry these upon bibulous paper.

Supertartrate of potash consists of 2 atoms tartaric acid, and 1 atom potash, and is therefore a *bi*tartrate. The potash of the subcarbonate neutralizes the excess of acid reducing the salt to a *tartrate of potash*, and the carbonic acid of the subcarbonate escapes in a *gaseous* state.

This salt is slightly deliquescent. Its crystals contain 2 atoms of water of crystallization. It is not often met with in the shops crystallized, being procured on the large scale by evaporating to dryness, and reducing to powder.

Prop. Aperient.—Dose, ʒij. to ℥j. in solution.

SODÆ CARBONAS.

CARBONATE OF SODA.

Recipe libram Subcarbonatis Sodæ;
Take a pound of the Subcarbonate of Soda;

octarios tres Aquæ destillatæ;
three pints of distilled Water;

Liqua Subcarbonatem Sodæ
Dissolve the Subcarbonate of Soda

in Aquâ destillatâ. Dein transmitte
in the distilled water. Then pass

Acidum carbonicum per liquorem in vase idoneo
carbonic acid through the liquor in a proper vessel

ad plenam saturationem, et sepone, ut crystalli
to a full saturation, and set aside, that crystals

fiant. Exsicca crystallos involutas et
may be formed. Dry the crystals folded and

compressas chartâ bibulâ. Consume
compressed in blotting paper. Evaporate

liquorem reliquum, cavendo ne calor
the remaining liquor, taking care lest the heat

excedat gradum centesimum vigesimum ut
should exceed the hundred and twentieth degree that

crystalli prodeant iterum. Exsicca et
crystals may be produced again. Dry and

comprime has eodem modo.
compress these in the same manner.

That which is called *sub*carbonate of soda by the College (for reasons already stated, page 91,) is a *carbonate*, being composed of 1 atom carbonic acid, and 1 atom soda. By passing a stream of carbonic acid gas through a solution of it, till the solution ceases to act on turmeric paper, *bi*carbonate of soda is formed, which, being less soluble in water than the carbonate, falls down in small crystals. But notwithstanding the cautions to be observed with respect to temperature, in evaporating the remaining solution, part of the carbonic acid is driven off, and even the crystals at first formed are partially deprived of carbonic acid by drying; so that this salt as met with in the shops is a *sesqui*carbonate, consisting of $1\frac{1}{2}$ atom carbonic acid, and 1 atom soda, with which are combined 2 atoms of water.

As regards the decomposition of marble by sulphuric acid for the purpose of obtaining carbonic acid gas, see the observations under *Potassæ Carbonas*.

Prop. The same as those of *Sodæ Subcarbonas*, but it is less nauseous, on account of the excess of carbonic acid.—Dose, gr. x. to gr. xxx. Generally employed with tartaric acid for making effervescing draughts as a substitute for soda water: the proportions are gr. xxx. of each ingredient to a half-pint tumbler of water.

SODÆ SUBCARBONAS.

SUBCARBONATE OF SODA.

Recipe libram Sodæ impuræ tritæ in pulverem;
Take a pound of impure Soda rubbed into a powder;

octarios quatuor Aquæ destillatæ ferventis;
four pints of boiling distilled Water;

Coque Sodam in Aquâ per horam dimidiam,
Boil the Soda in the Water for half an hour,

et cola. Hæc vaporet ad octarios duos, et
and strain. Let this evaporate to two pints, and

seponatur, ut crystalli fiant; rejice
be set aside, that crystals may be formed; reject

liquorem superstitem.
the remaining liquor.

Barilla or *kelp*, here called *impure soda*, is an *impure carbonate of soda*, and by solution, filtration, and crystallization, it is in a great measure freed from impurities.

This salt is seldom obtained as above, being plentifully met with in the markets as procured by more economical means.

The term *sub*carbonate is erroneous. It was formerly given for reasons stated at page 91. This salt consists of 1 atom carbonic acid, and 1 atom soda, and is therefore a *carbonate*. Its crystals contain 10 atoms of water, and are efflorescent.

PROP. Antacid, deobstruent, lithontriptic. It may be given as a lithontriptic in those cases alluded to under *Potassæ Subcarbonas*, or *Liquor Potassæ;* and appears, in general, to agree better with the stomach than those preparations.—DOSE, gr. x. to ʒj.

OFF. PREP. *Sodæ Subcarbonas exsiccata; Sodæ Carbonas; Soda tartarizata; Ferri Subcarbonas; Pilulæ Ferri comp.*

SODÆ SUBCARBONAS EXSICCATA.

DRIED SUBCARBONATE OF SODA.

Recipe libram Subcarbonatis Sodæ;
Take a pound of the Subcarbonate of Soda;

Adhibe calorem ferventem Subcarbonati
Apply a boiling heat to the Subcarbonate

Sodæ, in vase ferreo nitido, donec exsiccetur
of Soda, in a clean iron vessel, until it is dried

penitùs;	que	move	eam	assiduè	simul
thoroughly;	*and*	*stir*	*it*	*carefully*	*together*

spathâ ferreâ.	Denique,	tere	in pulverem.
with an iron spatula.	*Lastly,*	*rub (it)*	*into a powder.*

If a high temperature were employed, the whole of the 11 atoms of water contained in the crystals of the salt would be driven off; but as only a boiling heat is resorted to, there is merely a portion of the water expelled.

Dried subcarbonate of soda is more convenient for forming pills than the crystallized salt, which effloresces and causes them to fall to pieces.—DOSE, gr. v. to gr. xv.

SODÆ SULPHAS.

SULPHATE OF SODA.

Recipe	libras duas	Salis	qui	restat
Take	*two pounds*	*of the Salt*	*which*	*remains*

post destillationem	Acidi muriatici;	octarios duos
after the distillation	*of muriatic Acid;*	*two pints*

cum semisse	Aquæ ferventis;
with half (a pint)	*of boiling Water;*

Liqua	Salem	in Aquâ;	tum	adjice
Dissolve	*the Salt*	*in the Water;*	*then*	*add*

paulatim	Subcarbonatis	Sodæ	quod
gradually	*of the Subcarbonate*	*of Soda*	*that which*

sit	satis	ad	saturandum	Acidum.	Decoque
may be	*sufficient*	*to*	*saturate*	*the Acid.*	*Boil down*

donec	pellicula	appareat,	et,	ubi
until	*a pellicle*	*appears,*	*and,*	*when*

colaveris,	sepone	ut	crystalli
you shall have strained,	*set aside*	*that*	*crystals*

fiant. Effuso liquore, exsicca
may be formed. The liquor being poured off, dry

has super chartam bibulam.
these upon bibulous paper.

The salt remaining after the distillation of muriatic acid is sulphate of soda, which is deprived of a slight excess of sulphuric acid by the soda of the subcarbonate, the carbonic acid being expelled in the form of *gas.*

This salt consists of 1 atom sulphuric acid, and 1 atom soda, and its crystals, which contain 10 atoms of water, are efflorescent.

PROP. Aperient in doses of ℥ss. to ℥j. or more. It is more nauseous than sulphate of magnesia, but I think its action may be more depended upon.

SODA TARTARIZATA.

TARTARIZED SODA.

Recipe uncias viginti Subcarbonatis Sodæ;
Take twenty ounces of the Subcarbonate of Soda;

libras duas Supertartratis contritæ Potassæ;
two pounds of powdered Supertartrate of Potash;

octarios decem Aquæ ferventis;
ten pints of boiling Water;

Liqua Subcarbonatem Sodæ in Aquâ,
Dissolve the Subcarbonate of Soda in the Water,

et adjice paulatim Supertartratem Potassæ.
and add by degrees the Supertartrate of Potash.

Cola liquorem per chartam; tum coque donec
Strain the liquor through paper; then boil until

pellicula supernatet, et sepone ut
a pellicle swims upon the top, and set aside that

crystalli fiant.			Effuso liquore,		
crystals may be formed.			*The liquor being poured off,*		
exsicca	has	super	chartam	bibulam.	
dry	*these*	*upon*	*bibulous*	*paper.*	

Supertartrate of potash is a *bi*tartrate. Its excess of acid is neutralized by the soda of the subcarbonate, and *tartrate of soda* and *tartrate of potash* are the result of the process. The carbonic acid of the subcarbonate escapes in the state of *gas*.

This salt consists of 2 atoms tartaric acid, 1 atom potash, and 1 atom soda; or of 1 atom tartrate of potash, and 1 atom tartrate of soda. Salts constituted of an acid and two bases, are now called *double* salts. The crystals contain 8 atoms of water of crystallization, and are slightly efflorescent.

PROP. Aperient.—DOSE, ʒij to ℥j. This preparation is known under the name of *Rochelle Salt*, and is employed in making *Seidlitz powders;* which consist of ʒij of *tartarized soda* and ℈ij of *carbonate of soda* in one paper, and gr. xxxv. of *tartaric acid* in another paper: the contents of the first paper are to be dissolved in about half a pint of water, and then the acid is to be added, and the draught taken during effervescence.

TERRÆ ET EARUM SALES.

EARTHS AND THEIR SALTS.

Earths, like the fixed alkalies, are oxides of metals. *Lime*, *magnesia*, *baryta and strontia*, are called alkaline earths in consequence of their possessing causticity, and acting upon the vegetable colours after the manner of alkalies.

ALUMEN EXSICCATUM.

DRIED ALUM.

Alumen liquescat in vase fictili
Let the Alum dissolve in an earthen vessel

ad ignem; tum ignis augeatur donec
over the fire; then let the fire be increased until

ebullitio cessaverit.
the ebullition shall have ceased.

Alum has already been described in the Materia Medica. It is composed of 4 atoms sulphuric acid, 2 atoms alumina,* 1 atom potash, and its crystals contain 25 atoms of water. By the above process nearly the whole of the latter is driven off. If too powerful a heat be applied some of the acid will also be dissipated.

PROP.—Dried alum is chiefly used as an escharotic, which property is owing to its excess of acid, so that care should be taken not to employ too strong a heat in drying it. It is said to act as an aperient in cholic, especially when of that kind termed *cholica pictonum.* —DOSE, ℈j.

LIQUOR ALUMINIS COMPOSITUS.

COMPOUND SOLUTION OF ALUM.

Recipe Aluminis; Sulphatis Zinci, singulorum
Take of Alum; of the Sulphate of Zinc, of each

unciam dimidiam; Aquæ ferventis octarios duos;
half an ounce; of boiling Water two pints;

---

* Alumina is composed of 1 atom of the metal *aluminum*, and 1 atom oxygen ?

Liqua Alumen et Sulphatem Zinci simul
Dissolve the Alum and the Sulphate of Zinc together

in Aqua; dein cola per chartam.
in the Water; then strain through paper.

Prop.—Used as a local astringent in gleets, leucorrhoea, &c., and in some cases of ophthalmia after being diluted with rose or distilled water.

CALX.

LIME.

Recipe libram Marmoris albi;
Take a pound of white marble;

Contunde in frustula et ure per horam
Bruise (it) into small pieces and burn (it) for an hour

in crucibulo igne acerrimo, vel donec
in a crucible with a very fierce fire, or until

Acidum carbonicum expulsum fuerit penitùs,
the carbonic Acid shall be expelled thoroughly,

adeò ut Acidum aceticum dilutum adjectum
so that dilute acetic Acid being added

excitet nullas bullulas.
excites no bubbles.

CALX E TESTIS.

LIME FROM SHELLS.

Eodem modo Calx etiam fiat
In the same manner Lime also may be made

è Testis.
from Shells.

By exposing marble (carbonate of lime) to heat, the carbonic acid is expelled in the form of *gas,* and the lime remains in a caustic state. When shells are employed instead of marble, the animal matter which they contain is dissipated along with the carbonic acid, and lime remains. These methods of procuring lime are unnecessary, as common lime-stone, when fresh burnt, may always be used for the purposes of pharmacy.

Lime is composed of 1 atom of the metal *calcium*, and 1 atom oxygen, and its own weight of atom is 28.

When pure lime is exposed to the atmosphere it attracts moisture and carbonic acid, and is converted into the state of carbonate. When water is poured on fresh burnt lime, as in the process termed *slaking*, a considerable degree of heat is evolved, which is owing to a portion of the water combining with the lime, and assuming a solid form, and consequently giving out the heat it possessed in a latent state necessary to its liquidity. *Slaked lime* is a *hydrate*, composed of 1 atom lime, and 1 atom water. It parts with its water at a red heat.

OFF. PREP.—*Liquor Calcis; Liquor Ammoniæ; Liquor Potassæ; Potassa cum Calce; Calcis Murias; Liquor Calcis Muriatis.*

LIQUOR CALCIS.

SOLUTION OF LIME.

Recipe	selibram	Calcis;	octarios duodecim
Take	*half a pound*	*of Lime;*	*twelve pints*

Aquæ destillatæ;
of distilled Water;

Affunde	Aquam	Calci	et	agita
Pour	*the Water*	*to the Lime*	*and*	*shake* (*them*)

simul;	tum	protinùs	contege vas,	et
together;	*then*	*immediately*	*cover the vessel,*	*and*

sepone	per horas tres;	dein	serva	Liquorem
set (*it*) *aside*	*for three hours;*	*then*	*keep*	*the solution*

cum Calce superstite in vasis vitreis obturatis, et
with the remaining Lime in glass vessels stopped, and

ubi est utendum, sume ex limpido liquore.
when it is to be used, take from the clear solution.

Lime is more soluble in cold than in hot water. A pint of water at the temperature of 32° dissolves 11 grains of lime, while the same measure of water at 212° will only dissolve about half the quantity.

Lime water should be kept excluded from the air, otherwise the lime will abstract carbonic acid, and carbonate of lime will be precipitated. It is on this account that the solution is ordered to stand on the undissolved lime, so as to enable the water to take up more lime, should carbonate of lime be formed by occasionally admitting air into the bottle which contains the lime-water.

Prop.—Antacid. It may be given in those cases of dyspepsia and diarrhoea which depend on acidity.—Dose, f℥j. to f℥vj. Milk is the best vehicle for it on account of disguising its flavour without altering its properties.

CALCIS MURIAS.

MURIATE OF LIME.

Recipe libras duas Salis qui restat
Take two pounds of the Salt which remains

post sublimationem Subcarbonatis Ammoniæ;
after the sublimation of the Subcarbonate of Ammonia;

octarium Aquæ;
a pint of Water;

Misce et cola per chartam;
Mix and strain through paper;

vaporet liquor	donec	Sal	exsiccetur.
let the solution evaporate	*until*	*the Salt*	*be dried.*

Serva hunc	in vase	accuratè obturato.
Keep this	*in a vessel*	*accurately stopped.*

It has already been stated, page 92, that the substance remaining in the retort after the sublimation of subcarbonate of ammonia, is *chloride of calcium.* By dissolving this in water it becomes *muriate of lime.* The solution of muriate of lime being filtered and evaporated to dryness, is again resolved into *chloride of calcium.** The name given to this preparation by the College is consequently erroneous.

Chloride of calcium is very deliquescent, and ought to be kept in closely stopped bottles.

This substance, powdered and mixed with snow, will produce a freezing mixture that will sink the thermometer from $+32^{\circ}$ to -50°.

For its medical properties see the next preparation.

LIQUOR CALCIS MURIATIS.

SOLUTION OF MURIATE OF LIME.

Recipe	uncias duas	Muriatis	Calcis;
Take	*two ounces*	*of the Muriate*	*of Lime;*

fluiduncias tres	Aquæ destillatæ;
three fluid-ounces	*of distilled Water;*

---

* When a *chloride* is dissolved in water, a *muriate* is formed by the chlorine of the chloride uniting with the hydrogen of the water, and forming *muriatic acid;* while the oxygen of the water uniting with the metallic base, forms an *oxide*, which unites with the muriatic acid, forming a *muriate.* This muriate by evaporating to dryness again becomes a *chloride*, the hydrogen of the acid uniting with the oxygen of the oxide, and forming *water.*

Liqua Muriatem Calcis in Aqua, tum
Dissolve the Muriate of Lime in the Water, then

cola per chartam.
strain through paper.

From what has been said in the note under *Calcis Murias*, the nature of this compound will be at once understood, it being only necessary to bear in mind, that what is called *muriate of lime* by the College, is *chloride of calcium.*

Instead of seeking for the substance remaining in the retort after the sublimation of subcarbonate of ammonia, muriate of lime may be formed by dissolving white marble or pure chalk in muriatic acid, diluted with its weight of water. The solution of muriate of lime being filtered and evaporated to dryness, becomes, as already explained, chloride of calcium, which may be either kept in the solid state, or dissolved in water, according to the above formula.

PROP.—Tonic, deobstruent. It has been recommended by some practitioners in bronchocele, &c.—DOSE, ♏xx. to f ʒj., or more.

CRETA PRÆPARATA.

PREPARED CHALK.

Recipe libram Cretæ;
Take a pound of Chalk;

Adjice paululum Aquæ Cretæ, et tere
Add a little Water to the Chalk, and triturate

ut pulvis subtilis fiat. Conjice hunc
that a fine powder may be made. Cast this

in vas amplum plenum Aquâ; tum
into a large vessel filled with Water; then

agita, et, brevî morâ interpositâ,
shake (it), and, a short delay having interposed,

transmitte	aquam supernatantem	adhuc	turbidam
transmit	*the supernatant water*	*as yet*	*turbid*
in vas aliud,	et sepone,	ut	pulvis
into another vessel,	*and set (it) aside,*	*that*	*the powder*
subsidat.	Denique,	exsicca	pulverem,
may subside.	*Lastly,*	*dry*	*the powder,*
effusâ aquâ.			
the water being poured off.			

By following the above directions, chalk is freed from any soluble impurities it may contain, and is reduced to a minute state of division. The process is termed *elutriation*, and several powders are ordered by the College to be prepared in this way.

Chalk has already been described in the *Materia Medica.*

PROP.—Antacid. Useful in diarrhoeas, arising from acidity of the *primæ viæ*. It may be applied externally as an absorbent to ulcers attended with ichorous discharges.—DOSE, gr. x. to ℈ij. or more. See *Mist. Cretæ.*

OFF. PREP.—*Ammoniæ Subcarbonas; Hydrargyrum cum Creta; Mist. Cretæ; Confectio aromatica; Pulvis Cretæ C.; Pulvis Cretæ C. cum Opio.*

MAGNESIA.

MAGNESIA.

Recipe	uncias quatuor	Subcarbonatis
Take	*four ounces*	*of the Subcarbonate*
Magnesiæ;		
of Magnesia;		
Ure	per horas duas	igne acerrimo,
Burn (it)	*for two hours*	*with a very fierce fire,*

vel donec Acidum aceticum dilutum instillatum
or until dilute acetic Acid dropped in

excitet nullas bullulas.
excites no bubbles.

Subcarbonate of magnesia, which ought to be called *carbonate*, is described in the *Mat. Med.* and in the next *preparation*. By subjecting it to heat as above directed, the carbonic acid is driven off, and pure magnesia remains.

Magnesia is composed of 1 atom oxygen, and 1 atom of the metal *magnesium*, and is the only known oxide of that metal.

Magnesia when moistened acts slightly upon turmeric paper, and turns vegetable blues green, which properties entitle it to rank with alkaline earths; but it is almost insoluble in water, and its solution in that liquid exhibits no action on vegetable colours.

Magnesia slowly attracts both water and carbonic acid when exposed to the atmosphere.

PROP.—The same as those of *subcarbonate of magnesia*, but on account of its being devoid of carbonic acid the DOSE may be about one-third less than that of the subcarbonate.

MAGNESIÆ SUBCARBONAS.

SUBCARBONATE OF MAGNESIA.

Recipe libram Sulphatis Magnesiæ;
Take a pound of the Sulphate of Magnesia;

uncias novem Subcarbonatis Potassæ;
nine ounces of the Subcarbonate of Potash;

congios tres Aquæ.
three gallons of Water.

Liqua Subcarbonatem Potassæ in octariis tribus
Dissolve the Subcarbonate of Potash in three pints

Aquæ, Sulphatem Magnesiæ in octariis quinque
of Water, the Sulphate of Magnesia in five pints

Aquæ separatim, et cola; dein adjice
of Water separately, and strain; then add

reliquam Aquam liquori Sulphatis
the remaining Water to the solution of the Sulphate

Magnesiæ et coque; que admisce ei,
of Magnesia and boil; and mix to it,

dum ebullit, liquorem priorem, movens
whilst it is boiling, the former liquor, stirring

assiduè spathâ; tum cola per linteum:
constantly with a spatula; then strain through cloth:

denique, ablue pulverem, Aquâ fervente
lastly, wash the powder, boiling Water

affusâ sæpius, et exsicca
being poured thereon frequently, and dry

calore gradûs ducentesimi super
at a heat of the two-hundredth degree upon

chartam bibulam.
bibulous paper.

The carbonic acid of the subcarbonate (*carbonate*) of potash, unites with the magnesia of the sulphate, forming *subcarbonate (carbonate) of magnesia;* and the sulphuric acid of the sulphate unites with the potash, forming *sulphate of potash.* The sulphate of potash which is in solution is separated from the insoluble carbonate of magnesia, by washing and filtration.

The name adopted by the college is erroneous, this compound being a *carbonate* composed of 1 atom carbonic acid, and 1 atom magnesia.

Prop.—Subcarbonate of magnesia and pure magnesia are antacid. They are sometimes exhibited as purgatives, but they are inefficient in this respect unless they meet with acid matter in the *primæ viæ.* It has already been stated under *Liquor Potassæ* that alkaline remedies may be advantageously exhibited in those cases where uric acid is secreted in excess, which is known by a *reddish sediment* in the urine. In such cases also magnesia, or its carbonate, may be given; but not in those cases where the sediment in the urine is *white.*—Dose. Of the *subcarbonate*, ℈j. to ʒj.; that of *pure magnesia* may be about one-third less.

BARYTES, or BARYTA.

Baryta has been found, by the researches of Sir H. Davy, to consist of oxygen, and a peculiar metal termed *barium*. This earth is found under the form of *carbonate* and *sulphate* in this and other countries. All its soluble salts are poisonous. Carbonate of baryta also, which is insoluble in water, is dissolved in the stomach, and becomes poisonous.—*See* Poisons.

Pure baryta may be obtained by submitting carbonate of baryta mixed with charcoal to a white heat, or the nitrate to a red heat. Baryta is thus obtained in form of a grey powder. It is soluble in water, and the solution is possessed of alkaline properties. When exposed to the air the solution attracts carbonic acid, and carbonate of baryta is thrown down.

MURIAS BARYTÆ. *Muriate of Baryta*, Ed. Pharm.—Take of carbonate of baryta, and of muriatic acid, of each one part; of water three parts. The water and acid being mixed together, add the carbonate broken into small pieces. The effervescence having finished, digest for an hour; then filter, and after a sufficient evaporation, set the solution aside, that crystals may be formed. Evaporate the remaining solution as long as any crystals are formed.

The muriatic acid uniting with the baryta of the carbonate, forms *muriate of baryta* in solution, and the carbonic acid escapes in the form of *gas*.

Muriate of baryta is composed of 1 atom muriatic acid, and 1 atom baryta, and its crystals contain 1 atom of water.

Muriate of baryta is exhibited in the state of solution, which is directed to be made as follows, by the Edinburgh College:—

SOLUTIO MURIATIS BARYTÆ. *Solution of Muriate of Baryta.* Take of muriate of baryta (in crystals), one part; of distilled water, three parts. Dissolve.

PROP.—Stimulant, deobstruent. It is said to be efficacious in scrophula.—DOSE, ♏v. gradually increased to ♏xx. twice a-day. It requires to be exhibited with caution, on account of its poisonous properties.

METALLA ET EORUM SALES.

METALS, AND THEIR SALTS.

A general description of the metals is given in the Introduction.

PRÆPARATA EX ANTIMONIO.

PREPARATIONS FROM ANTIMONY.

There are three combinations of antimony and oxygen. Their composition is as follows:—

	Antimony.		Oxygen.		Weight of Atom.
Protoxide (*white*) ..	44	+	8	=	52
Deutoxide (*white*) ..	44	+	12	=	56
Peroxide (*yellow*) ..	44	+	16	=	60

Only the first of these is active in a medical point of view, the last two are inert.

The protoxide is a true oxide, uniting with acids and forming the salts of antimony.

The deutoxide being possessed of acid properties is called *antimonious acid*, and the salts which it forms with bases, are called *antimonites*.

The peroxide also ranks amongst the acids. It is called *antimonic acid*, and the salts which it forms with bases are called *antimoniates*.

ANTIMONII SULPHURETUM PRÆCIPITATUM
PRECIPITATED SULPHURET OF ANTIMONY.

Recipe libras duas Sulphureti contriti
Take two pounds of powdered Sulphuret

Antimonii; octarios quatuor Liquoris
of Antimony; four pints of the solution

Potassæ; octarios tres Aquæ destillatæ;
of Potash; three pints of distilled Water;

Acidi sulphurici diluti quantum sit
of dilute sulphuric Acid as much as may be

satis;
sufficient:

Misce Sulphuretum Antimonii, Liquorem
Mix the Sulphuret of Antimony, the solution

Potassæ, et Aquam inter se, et coque
of Potash, and the Water together, and boil

igne lento per horas tres, movens assiduè
with a slow fire for three hours, stirring constantly,

Aquâ destillatâ adjectâ subinde, adeò ut
distilled Water being added now and then, so that

impleat semper eandem mensuram. Cola
it may fill always the same measure. Strain

liquorem protinùs per linteum duplicatum, que
the solution immediately through folded cloth, and

instilla ei paulatim adhuc ferventi
drop to it by little and little whilst yet hot

quantum sit satis Acidi sulphurici diluti
as much as may be sufficient of diluted sulphuric Acid

ad dejiciendum pulverem; tum ablue Sulphatem
to precipitate the powder; then wash the Sulphate

Potassæ	Aquâ calidâ ;	exsicca
of Potash	*with warm Water ;*	*dry*

Sulphuretum præcipitatum	Antimonii,	et	tere
the precipitated Sulphuret	*of Antimony,*	*and*	*triturate*

in	pulverem subtilem.
into	*a fine powder.*

Part of the potash and part of the sulphuret of antimony exchange elements with each other: the sulphur of the sulphuret unites with the potassium of the potash, forming *sulphuret of potassium*, while the oxygen of the potash unites with the antimony of the sulphuret, forming *protoxide of antimony;* this oxide, by uniting with undecomposed sulphuret of antimony forms *oxy-sulphuret of antimony*, which is held in solution by that portion of the hot liquor potassæ which is not decomposed during the process. On adding the sulphuric acid, *sulphate of potash* is formed in solution, and the oxy-sulphuret is then thrown down, and sulphuretted hydrogen escapes in the form of *gas*, owing to the decomposition of a portion of sulphuret of potassium.*

PROP.—Diaphoretic, expectorant, emetic, according to the dose. It is now chiefly used as an alterative in conjunction with mercurials.—DOSE, gr. j. to gr. iv. in form of pill twice a-day.

OFF. PREP.—*Pilulæ Hydrargyri Submuriatis comp.*

ANTIMONIUM TARTARIZATUM.

TARTARIZED ANTIMONY.

Recipe	Vitri	Antimonii	contriti
Take	*of the Glass*	*of Antimony*	*rubbed*

---

* Gay-Lussac. It is explained by some chemists, that the antimony derives oxygen from the water, the hydrogen of which with the sulphur of the sulphuret gives rise to sulphuretted hydrogen.

in pulverem subtilissimum; Supertartratis
into a very fine powder; of the Supertartrate

Potassæ contritæ, singulorum libram;
of Potash powdered, of each a pound;

Aquæ destillatæ ferventis congium;
of boiling distilled Water a gallon;

Misce Vitrum Antimonii accuratè
Mix the Glass of Antimony accurately

cum Supertartrate Potassæ, et conjice
with the Supertartrate of Potash, and throw (them)

paulatim in Aquam destillatam ferventem, movens
gradually into boiling distilled Water, stirring

assiduè spathâ; coque per quadrantem
constantly with a spatula; boil for a quarter

horæ, et sepone. Cola
of an hour, and set aside. Strain

liquorem frigefactum, et decoque liquorem colatum
the cooled solution, and boil down the strained solution

ut crystalli fiant.
that crystals may be formed.

The excess of acid in the supertartrate of potash unites with the protoxide of antimony contained in the glass of antimony, and *tartrate of antimony* is formed and held in solution along with *tartrate of potash.*

After filtering the solution, the *sulphur* and *silex* of the glass of antimony will be found upon the filter.

This double salt, according to Dr. Thomson, consists of 2 atoms tartaric acid, 3 atoms protoxide of antimony, and 1 atom potash. Its crystals contain 2 atoms of water.*

Tartarized antimony should always be purchased in

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* Mr. Phillips says 3 atoms of water.

crystals, as it is liable to be adulterated when in powder.

Prop.—This is the most useful of the antimonial preparations. It is emetic in doses of from gr. j. to gr. ij. It should be given, dissolved in distilled water, as the impurities of common water decompose it. As a diaphoretic, the dose is from gr. $\frac{1}{16}$ to gr. $\frac{1}{4}$. In small doses it is also exhibited as an expectorant in conjunction with squills, &c. Combined in small doses with calomel, it is alterative, and it assists the action of cathartics, when conjoined with them in obstinate costiveness. ʒiij. mixed with ℥j. of lard, forms an ointment, a little of which being daily rubbed on the skin, gives rise to a pustular eruption, which is found to relieve deep-seated inflammations.

Off. Prep.—*Vinum Antimonii tartarizati.*

VINUM ANTIMONII TARTARIZATI.

WINE OF TARTARIZED ANTIMONY.

Recipe scrupulum Antimonii tartarizati;
Take a scruple of tartarized Antimony:

fluiduncias octo aquæ destillatæ ferventis;
eight fluid-ounces of boiling distilled Water;

fluiduncias duas Spiritûs rectificati;
two fluid ounces of rectified Spirit;

Liqua Antimonium tartarizatum in
Dissolve the tartarized Antimony in

Aquâ destillatâ fervente; tum adjice spiritum
boiling distilled Water; then add the spirit

liquori colato.
to the strained solution.

Prop.—Emetic or diaphoretic, according to the dose, which may be easily regulated by bearing in mind that half a fluid-ounce contains one grain of *tartarized antimony.*

PULVIS ANTIMONIALIS.

ANTIMONIAL POWDER.

Recipe libram Antimonii Sulphureti contriti;
Take a pound of powdered Sulphuret of Antimony;

libras duas Cornuum rasorum;
two pounds of Horns shaved (hartshorn shavings);

Misce, et conjice in crucibulum latum
Mix, and throw (them) into a wide crucible

candens* igne, et move assiduè,
glowing in the fire, and stir (them) constantly,

donec vapor conspicuus non ampliùs ascendat.
until a visible vapour no longer arises.

Quod restat tere in pulverem, et
That which remains triturate into a powder, and

immitte crucibulo idoneo. Tum subministra
put (it) in a proper crucible. Then apply

ignem et auge paulatim, ut
the fire and increase (it) gradually, that

candeat per horas duas. Tere residuum,
it may whiten for two hours. Triturate the residue,

ut pulvis subtilissimus fiat.
that a very fine powder may be made.

The sulphur of the sulphuret is driven off by the heat, and the antimony absorbs oxygen from the atmosphere; the hartshorn shavings also undergo decomposition, the animal matter which they contain being driven off by heat, leaving only their phosphate of lime. Pulvis antimonialis, therefore, consists of *oxide of antimony* and *phosphate of lime.*

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* Heated to whiteness.

By continuing the heat so as to drive off all the sulphur, the antimony is converted into a higher state of oxidation than that of protoxide, or the protoxide may be volatilized, and it is on this account that the preparation is uncertain both in composition and medical efficacy.

Prop.—Diaphoretic in doses of gr. iij. to gr. viij. It is also said to be alterative, emetic, and purgative, according to the dose. Should the practitioner meet with a sample containing a sufficiency of the protoxide of antimony, its exhibition might be found efficacious, but should no protoxide be present in the sample, neither good nor bad effects can arise from its administration.

PRÆPARATUM EX ARGENTO.

PREPARATION FROM SILVER.

There is only one combination of silver and oxygen, which is thus constituted:—

	Silver.		Oxygen.		Weight of Atom.
Oxide of Silver (*brown*)	110	+	8	=	118

ARGENTI NITRAS.

NITRATE OF SILVER.

Recipe	unciam	Argenti;	fluidunciam
Take	*an ounce*	*of Silver;**	*a fluid-ounce*

Acidi nitrici;	fluiduncias duas	Aquæ destillatæ;
of nitric Acid;	*two fluid-ounces*	*of distilled Water;*

---

* The College should have ordered *pure* silver, as standard silver contains copper.

Misce Acidum nitricum Aquâ, et
Mix the nitric Acid with the Water, and

liqua Argentum in his balneo arenæ. Dein
dissolve the Silver in these in a bath of sand. Then

auge calorem paulatim, ut Nitras Argenti
increase the heat gradually, that the Nitrate of Silver

siccetur. Liquefac hanc in crucibulo,
may be dried. Dissolve this in a crucible,

lento igne, donec, Aquâ expulsâ,
with a slow fire, until, the Water being expelled,

ebullitio cessaverit; tum effunde
ebullition shall have ceased; then pour off

statim in formas idoneas.
immediately into convenient moulds.

Part of the nitric acid is decomposed: the silver attracts oxygen from it, forming *oxide of silver*, and *nitric oxide gas* escapes, which is converted into *nitrous acid vapour*, by uniting with oxygen from the atmosphere. The nitric acid undecomposed combines with the oxide of silver, and *nitrate of silver* is formed in solution.

The solution very readily yields crystals, but the salt is seldom met with in a crystallized state, being chiefly kept in the form of sticks. It should be carefully excluded from the light, which decomposes it.

Nitrate of silver is composed of 1 atom nitric acid, and 1 atom oxide of silver. It is not deliquescent.

Prop.—Internally, tonic, antispasmodic. Given in epilepsy, chorea, &c. Externally, caustic.—Dose, gr. $\frac{1}{8}$. to gr. iv. cautiously increased. It should be given in form of pill, with crumbs of bread.

PRÆPARATA EX ARSENICO.

PREPARATIONS FROM ARSENIC.

There are two combinations of oxygen and arsenic, both of which possess acid properties. They are termed *arsenious* and *arsenic* acid. Their composition has been variously stated. According to Dr. Thomson, they are constituted as follows:—

	Arsenic.		Oxygen.
Arsenious acid (*white*)	38	+	16
Arsenic acid (*white*)	38	+	24

The oxygen here is as 2, 3.

According to Berzelius their elements are united in the following proportions:—

	Arsenic.		Oxygen.
Arsenious acid	38	+	12, or $1\frac{1}{2}$ atom.
Arsenic acid	38	+	20, or $2\frac{1}{2}$ atoms.

The oxygen, in the latter case, is as 3, 5.

ARSENICUM ALBUM SUBLIMATUM.

SUBLIMED WHITE ARSENIC.

Tere Arsenicum album in pulverem; tum
Triturate white Arsenic into a powder; then

conjice in crucibulum, et admoto igne,
throw (it) into a crucible, and the fire being applied,

sublima in crucibulum aliud superimpositum
sublime into another crucible placed upon

priori.
the former.

This is an unnecessary preparation, for if white arsenic *(arsenious acid)* be purchased in large lumps it will be found very pure. But it should never be purchased in the state of powder, as it is then generally adulterated with other substances, such as lime or gypsum.

PROP. — See *Mat. Med.* and *Liquor Arsenicalis.* DOSE, gr. $\frac{1}{16}$. to gr. $\frac{1}{6}$.

OFF. PREP.—*Liquor Arsenicalis.*

LIQUOR ARSENICALIS.

ARSENICAL SOLUTION.

Recipe Arsenici albi sublimati, triti
Take of sublimed white Arsenic, triturated

in pulverem subtilissimum; Subcarbonatis
into a very fine powder; of the Subcarbonate

Potassæ ex Tartaro, singulorum,
of Potash from Tartar, of each,

grana sexaginta quatuor; Spiritûs compositi
sixty-four grains; of compound Spirit

Lavandulæ fluidrachmas quatuor; Aquæ destillatæ
of Lavender four fluid-drams; of distilled Water

octarium;
a pint;

Coque Arsenicum album et Subcarbonatem
Boil the white Arsenic and the Subcarbonate

Potassæ cum Aquâ in vase vitreo, donec
of Potash with the Water in a glass vessel, until

Arsenicum omne liquetur. Liquori frigefacto
all the Arsenic is dissolved. To the cooled liquor

adjice Spiritum compositum Lavandulæ. Denique,
add the compound Spirit of Lavender. Lastly,

adjice insuper quantum sit satis
add thereon as much as may be sufficient

Aquæ destillatæ, ut impleat accuratè
of distilled Water, that it may fill accurately

mensuram octarii.
the measure of a pint.

The arsenious acid unites with the potash of the subcarbonate, forming *arsenite of potash*, and the carbonic acid escapes in the form of *gas*.

Two fluid-drams of this solution contain one grain of sublimed white arsenic.

Prop.—Powerfully tonic. Chiefly serviceable in intermittent fevers, periodic head-aches, and in some obstinate cutaneous affections.—Dose, ♏v., which may be increased to ♏x. or more, twice a-day.

PRÆPARATUM E BISMUTHO.

PREPARATION FROM BISMUTH.

There is only one combination of this metal with oxygen, which is constituted as follows:—

	Bismuth.		Oxygen.		Weight of Atom.
Oxide of bismuth (*yellow*)	72	+	8	=	80

BISMUTHI SUBNITRAS.

SUBNITRATE OF BISMUTH.

Recipe unciam Bismuthi; fluidunciam cum
Take an ounce of Bismuth; a fluid-ounce with

semisse	Acidi nitrici ;	octarios tres
half (a fluid-ounce)	*of nitric Acid ;*	*three pints*

Aquæ destillatæ ;
of distilled Water ;

Misce	fluidrachmas sex	Aquæ destillatæ	cum
Mix	*six fluid-drams*	*of distilled Water*	*with*

Acido nitrico,	et	liqua	Bismuthum	in his ;
the nitric Acid,	*and*	*dissolve*	*the Bismuth*	*in these ;*

tum	cola.	Adjice	quod	est	reliquum
then	*strain.*	*Add*	*that which*	*is*	*left*

Aquæ	liquori colato,	et	sepone
of the Water	*to the strained solution,*	*and*	*set aside*

ut	pulvis	subsidat.	Deinde
that	*the powder*	*may subside.*	*Then*

effuso liquore supernatante,	ablue
the Supernatant liquor being poured off,	*wash*

Subnitratem	Bismuthi	Aquâ destillatâ,
the Subnitrate	*of Bismuth*	*with distilled Water,*

et	exsicca	leni calore,	involutam
and	*dry (it)*	*with a gentle heat,*	*folded*

chartâ bibulâ.
in blotting paper.

The bismuth decomposes part of the nitric acid, and *nitrate of bismuth* is formed in solution with the evolution of nitric oxide* gas.

On diluting the solution with water, the oxide of bismuth is precipitated along with some nitric acid forming *subnitrate of bismuth.* This precipitation, on adding water to the nitric solution, is one of the

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* The theory of the process is not here *particularly* described, because the decomposition of nitric acid, by silver, has been explained at page 131.

N 2

characteristic features by which bismuth is distinguished from most other metals.

Subnitrate of bismuth consists of 3 atoms oxide of bismuth, and 1 atom nitric acid.

Prop.—Tonic, antispasmodic. Serviceable in several varieties of dyspepsia, where the disease is not dependant upon organic derangement.

Dose, gr. iv. to gr. x., combined with either extract of hops, or extract of gentian.

PRÆPARATA E CUPRO.

PREPARATIONS FROM COPPER.

There are two oxides of copper, both of which unite with acids, forming *proto* and *per-* salts of copper. These oxides are constituted as follows:—

	Copper.		Oxygen.		Weight of Atom.
Protoxide of copper (*red*)	64	+	8	=	72
Peroxide of copper (*black*)	64	+	16	=	80

CUPRUM AMMONIATUM.

AMMONIATED COPPER.

Recipe unciam dimidiam Sulphatis Cupri;
Take half an ounce of the Sulphate of Copper;

drachmas sex Subcarbonatis Ammoniæ;
six drams of the Subcarbonate of Ammonia;

Tere simul in mortario vitreo, donec
Rub (them) together in a glass mortar, until

ebullitio cessaverit; deinde, leni calore,
ebullition shall have ceased; then, with a gentle heat,

exsicca Cuprum ammoniatum, involutum
dry the ammoniated Copper, folded

chartâ bibulâ.
in bibulous paper.

Sulphate of copper, strictly speaking, is a *bi*sulphate, consisting of 2 atoms of sulphuric acid, and 1 atom of peroxide of copper, and its crystals contain 10 atoms of water. When this salt is triturated with the subcarbonate of ammonia, the ammonia abstracts part of its sulphuric acid, and *sulphate of ammonia* and *subsulphate of copper* are the result of the decomposition. During the process the carbonic acid of the subcarbonate escapes in the form of *gas*, and the mass is rendered moist by the water of crystallization of the sulphate of copper.—See *Addenda*.

This compound consists of sulphuric acid, peroxide of copper, and some undecomposed subcarbonate of ammonia.

Prop.—Tonic, antispasmodic. It is chiefly exhibited in epilepsy and chorea.—Dose, gr. $\frac{1}{4}$. to gr. v. in form of pill.

Off. Prep.—*Liquor Cupri ammoniati.*

LIQUOR CUPRI AMMONIATI.

SOLUTION OF AMMONIATED COPPER.

Recipe drachmam Cupri ammoniati; octarium
Take a dram of ammoniated Copper; a pint

Aquæ destillatæ;
of distilled Water;

Liqua Cuprum ammoniatum in Aquâ, et
Dissolve the ammoniated Copper in the water, and

cola per chartam.
strain through paper.

PROP.—Mildly escharotic, detergent. Applied to foul indolent ulcers, it causes them to assume a healthy appearance, and when properly diluted, it may be employed for removing specks of the cornea.

PRÆPARATA E FERRO.

PREPARATIONS FROM IRON.

There are 2 oxides of this metal, both of which unite with acids, and form salts. They are constituted as follow:

	Iron.		Oxygen.		Weight of Atom.
Protoxide (*blueish-black*) ..	28	+	8	=	36
Peroxide (*red*)	28	+	12	=	40

The oxygen in the 2 oxides is therefore as 1 and $1\frac{1}{2}$.

FERRUM AMMONIATUM.

AMMONIATED IRON.

Recipe Subcarbonatis Ferri; Acidi muriatici;
Take of the Subcarbonate of Iron; of muriatic Acid;

Muriatis Ammoniæ, singulorum libram;
of the Muriate of Ammonia, of each a pound;

Superinfunde Acidum muriaticum Subcarbonati
Pour the muriatic Acid to the Subcarbonate

Ferri, et sepone donec bullulæ non ampliùs
of iron, and set aside until bubbles no longer

excitentur. Cola liquorem per chartam, et
are excited. Strain the solution through paper, and

decoque	colatum	donec	omnis humor
boil down	*the strained (solution)*	*until*	*all the moisture*
consumptus sit.	Quod	restat	misce diligenter
is evaporated.	*That which*	*remains*	*mix diligently*
cum Muriate	Ammoniæ:	tum	igne acri
with the Muriate	*of Ammonia:*	*then*	*a fierce fire*
subjecto,	sublima	protinùs:	denique, tere
being applied,	*sublime*	*immediately:*	*lastly, rub*
in pulverem.			
into a powder.			

According to Mr. Phillips, subcarbonate of iron consists of

Carbonate of the protoxide of iron ..	4
Peroxide of iron	96
In	100 parts.

The muriatic acid unites with the protoxide of the carbonate, and the peroxide forming *protomuriate* and *permuriate of iron*, and the carbonic acid of the carbonate is expelled in the state of *gas*. By boiling down to dryness, oxygen is absorbed, and the whole is converted into permuriate of iron, which is then mixed with the muriate of ammonia and sublimed. A portion of the subcarbonate of iron remains undissolved, in consequence of there being a deficiency of acid.

Ferrum ammoniatum is composed of muriate of ammonia and permuriate or perchloride of iron.

Prop.—Tonic, emmenagogue, and aperient. It is considered an uncertain medicine, and is now seldom employed.—Dose, gr. iij. to gr. xv.

Off. Prep.—*Tinctura Ferri ammoniati.*

FERRI SUBCARBONAS.

SUBCARBONATE OF IRON.

Recipe	uncias octo	Sulphatis	Ferri;
Take	*eight ounces*	*of the Sulphate*	*of Iron;*

uncias sex Subcarbonatis Sodæ; congium
six ounces of the Subcarbonate of Soda; a gallon

Aquæ ferventis;
of boiling Water;

Liqua Sulphatem Ferri et Subcarbonatem
Dissolve the Sulphate of Iron and the Subcarbonate

Sodæ separatim in octariis quatuor Aquæ; tum
of Soda separately in four pints of Water; then

misce liquores inter se et sepone, ut
mix the solutions together and set aside, that

pulvis subsidat; deinde, effuso liquore
the powder may subside; then, the supernatant liquor

supernatante, ablue Subcarbonatem Ferri
being poured off, wash the Subcarbonate of Iron

Aquâ calidâ, et exsicca leni calore
with warm Water, and dry (it) with a gentle heat

involutam chartâ bibulâ.
folded in bibulous paper.

The sulphuric acid of the sulphate of iron unites with the soda of the subcarbonate, forming *sulphate of soda* in solution, and the protoxide of iron of the sulphate unites with the carbonic acid of the subcarbonate, forming *carbonate of iron*, which is thrown down. The precipitate is at first of a green colour, but by drying, it becomes red, in consequence of the protoxide of iron of the carbonate attracting oxygen from the atmosphere, and being converted into the peroxide. As carbonic acid does not unite with peroxide of iron in a solid state, but only in solution, it escapes as the iron arrives at its maximum of oxidation.

Subcarbonate of iron, as usually met with, consists, according to Mr. Phillips, of

Protocarbonate of iron	4
Peroxide of iron	96
In	100 parts

PROP.—Tonic, emmenagogue.—DOSE, gr. v. to ʒss. or more.

OFF. PREP.—*Ferrum ammoniatum; Tinctura Ferri Muriatis.*

FERRI SULPHAS.

SULPHATE OF IRON.

Recipe Ferri Acidi sulphurici, singulorum
Take of Iron (and) of sulphuric Acid, of each

(pondere) uncias octo; Aquæ octarios quatuor;
(by weight) eight ounces; of Water four pints;

Misce Acidum sulphuricum cum Aquâ
Mix the sulphuric Acid with the Water

in vase vitreo, que his adjice Ferrum;
in a glass vessel, and to these add the Iron;

tum, ubi bullulæ cessaverint exire,
then, when bubbles shall have ceased to go forth,

cola liquorem per chartam, que
strain the solution through paper, and

consume eum ad ignem, adeò ut, dum
evaporate it over the fire, so that, whilst

frigescit, crystalli fiant. Exsicca has super
it cools, crystals may be formed. Dry these upon

chartam bibulam, effuso liquore.
bibulous paper, the liquor being poured off.

Part of the water is decomposed: the iron attracting its oxygen, protoxide of iron is formed, which unites with the sulphuric acid, forming *sulphate of iron*, while the hydrogen of the water escapes in the form of *gas*. The sulphate of iron is held in solution by the undecomposed water, and is obtained in crystals by the necessary evaporation.

Sulphate of iron consists of 1 atom sulphuric acid and

1 atom protoxide of iron, and its crystals contain 7 atoms of water. Its crystals effloresce on exposure to the air, and the protoxide attracts oxygen.

This salt is commonly called *green vitriol.* On the large scale it is prepared from native sulphuret of iron, which is exposed to the air and moistened. Oxygen being absorbed by the sulphur and iron, the surface becomes gradually encrusted with sulphate of iron, which by solution and evaporation is obtained in crystals.

PROP.—Tonic, emmenagogue, and anthelmintic. It is said to form a useful lotion for cancerous and phagadenic ulcers when dissolved in water.—DOSE, gr. j. to gr. v.

OFF. PREP.—*Ferri Subcarbonas; Mistura Ferri C.; Pilulæ Ferri C.*

FERRUM TARTARIZATUM.

TARTARIZED IRON.

Recipe Ferri libram; contritæ Supertartratis
Take of Iron a pound; of powdered Supertartrate

Potassæ libras duas; Aquæ destillatæ
of potash two pounds; of distilled Water

octarios quinque, vel quantum sit satis;
five pints, or as much as may be sufficient;

Tere Ferrum et Supertartratem Potassæ
Rub the Iron and the Supertartrate of Potash

simul, et expone aëri per dies viginti
together, and expose (them) to the air for twenty days

cum octario Aquæ in vase vitreo patulo,
with a pint of Water in an open glass vessel,

agitans quotidie, Aquâ destillatâ adjectâ
shaking (them) daily, distilled Water being added

subindè, ut sint semper humida. Dein
frequently, that they may be always moist. Then

coque per quadrantem horæ octariis quatuor
boil for a quarter of an hour in four pints

Aquæ destillatæ, et cola. Consume liquorem
of distilled Water, and strain. Evaporate the solution

balneo aquoso, donec Ferrum tartarizatum sit
in a water-bath, until the tartarized Iron be

exsiccatum penitùs. Tere hoc in pulverem, et
dried thoroughly. Rub this into a powder, and

serva vase bene obturato.
keep (it) in a vessel well stopped.

By exposure to air and moisture the iron attracts oxygen, and is eventually converted into the state of *peroxide*, which with the excess of acid in the supertartrate of potash, forms *tartrate of iron*, and the supertartrate of potash is reduced to the state of *tartrate.*

Tartarized iron, as it is erroneously called, is a double salt, consisting of 1 atom pertartrate of iron and 1 atom tartrate of potash. It generally contains uncombined oxide of iron, in consequence of an insufficiency of bitartrate of potash, and metallic iron is often found in it. As it is deliquescent it ought to be kept in well stopped bottles.

Prop.—Tonic, &c. As it is less nauseous than the other preparations of iron, it may be conveniently given to children, and those whose stomachs will not bear the stronger chalybeates. It is supposed to possess both a tonic and diuretic effect, and is therefore recommended in dropsies.—Dose, gr. x. to ʒss. in form of bolus, or in solution, combined with some aromatic.

LIQUOR FERRI ALKALINI.

SOLUTION OF ALKALINE IRON.

Recipe drachmas duas Ferri cum semisse;
Take two drams of Iron with half a dram);

fluiduncias duas Acidi nitrici; fluiduncias sex
two fluid-ounces of nitric Acid; six fluid-ounces

Aquæ destillatæ; fluiduncias sex Liquoris
of distilled Water; six fluid-ounces of the Solution

Subcarbonatis Potassæ;
of the Subcarbonate of Potash;

Superinfunde Ferro Acidum et Aquam
Pour upon the Iron the Acid and the Water

mista inter se: tum, ubi bullulæ cessaverint
mixed together: then, when bubbles shall have ceased

exire, effunde liquorem adhuc acidum.
to go forth, pour off the liquor whilst yet acid.

Adjice hunc paulatim et ex intervallis
Add this by little and little and at intervals

Liquori Subcarbonatis Potassæ,
to the Solution of the Subcarbonate of Potash,

subindè agitans, donec jam,
occasionally shaking (it), until just when,

colore fusco-rubicundo facto, bullulæ nullæ
a brownish-red colour being produced, no bubbles

ampliùs excitentur. Denique, sepone
are any more excited. Lastly, set (it) aside

per horas sex, et effunde liquorem.
for six hours, and pour off the liquor.

The iron decomposes part of the nitric acid, and peroxide of iron is formed, nitric oxide being given off in the state of *gas*, which is converted into *nitrous acid vapour* at the moment it comes in contact with the oxygen of the atmosphere. The peroxide of iron thus formed unites with the undecomposed nitric acid, forming *pernitrate of iron* in solution, with excess of acid.

When this solution and the solution of subcarbonate of potash are added together, the latter is partly decomposed by the nitric acid of the nitrate of iron uniting with the potash, and forming *nitrate of potash* in solution, carbonic acid *gas* being liberated. As this takes place, the peroxide of iron of the nitrate of iron is for an instant precipitated; but is immediately re-dissolved by that portion of the subcarbonate of potash which is not decomposed.

The composition of this preparation is not satisfactorily ascertained. It is a useless incumbrance to the Pharmacopœia; for, as Dr. Paris observes, "it cannot be exhibited in any form without undergoing decomposition."

As there are other preparations of iron whose properties may be relied upon, no judicious prescriber would ever think of ordering this when it is necessary to resort to chalybeates.

TINCTURA FERRI AMMONIATI.

TINCTURE OF AMMONIATED IRON.

Recipe	uncias quatuor	Ferri ammoniati;
Take	*four ounces*	*of ammoniated Iron;*

octarium	Spiritûs tenuioris;
a pint	*of proof Spirit;*

Macera, et cola.
Macerate, and strain.

Prop.—The same as those of the salt.—**Dose**, fʒss. to fʒij.

TINCTURA FERRI MURIATIS.

TINCTURE OF MURIATE OF IRON.

Recipe	libram dimidiam	Subcarbonatis
Take	*half a pound*	*of the Subcarbonate*

Ferri;	octarium	Acidi muriatici;	octarios tres
of Iron;	*a pint*	*of muriatic Acid;*	*three pints*

Spiritûs rectificati;
of rectified Spirit;

Superinfunde Acidum Subcarbonati Ferri
Pour the Acid to the Subcarbonate of Iron

in vase vitreo, et agita subindè
in a glass vessel, and shake (it) from time to time

per triduum. Sepone ut fæces
for three days. Set (it) aside that the dregs

(si sint quæ) subsidant; dein effunde
(if there be any) may subside; then pour off

liquorem, que adjice Spiritum ei.
the liquor, and add the Spirit to it.

The muriatic acid unites with the protoxide and peroxide of iron of the subcarbonate (see its composition), forming *protomuriate* and *permuriate of iron* in solution, and carbonic acid escapes in the state of *gas*. The solubility of the muriates is increased by the addition of the rectified spirit.

Prop.—This preparation possesses the active properties of the chalybeates in an eminent degree, and may be exhibited in all cases requiring the use of such remedies. Given in the proportion of five or six drops every ten minutes, until nausea be produced, it is said to relieve spasmodic stricture of the urethra. Externally, it is employed as a styptic.—The Dose, under ordinary circumstances, is from ♏x. to ♏xxx. or more, in water.

VINUM FERRI.

WINE OF IRON.

Recipe drachmam Ferri; drachmas sex
Take a dram of Iron; six drams

Potassæ Supertartratis contritæ; octarios duos
of powdered Supertartrate of Potash; two pints

Aquæ destillatæ, vel quantum sit satis
of distilled Water, or as much as may be sufficient;

fluiduncias viginti Spiritûs tenuioris:
twenty fluid-ounces of proof Spirit:

Tere Ferrum et Supertartratem Potassæ
Rub the Iron and the Supertartrate of Potash

simul, et expone aëri
together, and expose (them) to the air

per hebdomadas sex in vase vitreo patulo cum
for six weeks in an open glass vessel with

fluidunciâ Aquæ, movens quotidie
a fluid-ounce of Water, stirring (them) daily

spathâ, Aquâ destillatâ adjectâ subindè,
with a spatula, distilled Water being added occasionally,

ut sint semper humida. Dein exsicca
that they may be always moist. Then dry

leni calore, tere in pulverem, et
with a gentle heat, triturate into a powder, and

misce cum fluidunciis triginta Aquæ destillatæ.
mix (this) with thirty fluid-ounces of distilled Water.

Cola liquorem, et adjice Spiritum
Strain the liquor, and add the Spirit

colato.
to the strained (liquor).

The decomposition which takes place in forming this preparation is similar to that already described under *Ferrum tartarizatum.*

If the College had ordered a given quantity of the *Ferrum tartarizatum* to be dissolved in proof spirit, that which takes six weeks to accomplish, according to the above directions, might have been effected in about six minutes.

Wine of iron contains tartrate of iron and potash, with excess of supertartrate of potash.

Prop.—The same as those of the other preparations of iron.—Dose, f℥j. to f℥vj., or more.

PRÆPARATA EX HYDRARGYRO.

PREPARATIONS FROM MERCURY.

There are two oxides of mercury, both of which unite with acids forming the salts of mercury. They are constituted as follows:

	Mercury.		Oxygen.		Weight of Atom.
Protoxide (*black*)	200	+	8	=	208
Peroxide (*red*)	200	+	16	=	216

There are two combinations of chlorine and mercury, viz.

	Mercury.		Chlorine.		Weight of Atom.
Protochloride (*calomel*) ..	200	+	36	=	236
Perchloride (*corrosive sub.*)	200	+	72	=	272

The protoxide and protochloride are the most useful in a medical point of view; but the peroxide and perchloride are the most active, and are also powerfully poisonous.

There are also two *sulphurets* in which the sulphur is as 1 and 2; but these are not so important.

HYDRARGYRUM CUM CRETA.

MERCURY WITH CHALK.

Recipe uncias tres, pondere, purificati
Take three ounces, by weight, of purified

Hydrargyri; uncias quinque Cretæ preparatæ;
Mercury; five ounces of prepared Chalk;

Tere simul, donec globuli conspiciantur
Rub (them) together, until globules are seen

non ampliùs.
no longer.

It is supposed, that during trituration a portion of the metal combines with oxygen, and is converted into a state of oxidation, while the remaining portion becomes in a state of mechanical division with the chalk.

There are three grains of mercury in eight grains of this preparation.

PROP.—Alterative. It is a useful medicine for children.—DOSE, gr. v. to ʒss. in any thick vehicle.

HYDRARGYRI NITRICO-OXYDUM.

NITRIC-OXIDE OF MERCURY.

Recipe libras tres, pondere, purificati
Take three pounds, by weight, of purified

Hydrargyri; libram cum semisse, pondere,
Mercury; a pound with half (a pound), by weight,

Acidi nitrici, octarios duos Aquæ destillatæ;
of nitric Acid, two pints of distilled Water;

Misce in vase vitreo, et coque, donec
Mix in a glass vessel, and boil, until

Hydrargyrum liquetur, et, Aquâ
the Mercury be dissolved, and, the Water

consumptâ, materia alba restet. Tere
being evaporated, a white substance remain. Rub

hanc in pulverem, et conjice in vas aliud
this into a powder, and throw (it) into another vessel

quàm minimè profundum; tum adhibe
as little as possible deep; then apply thereto

ignem lenem que auge eum paulatim, donec
a gentle fire and increase it gradually, until

vapor ruber cessaverit prodire.
a red vapour shall cease to go forth.

Part of the nitric acid is decomposed; the mercury uniting with part of its oxygen *peroxide of mercury* is formed, and nitric oxide escapes in the state of *gas*, and is converted into *nitrous acid vapour* at the moment it comes in contact with the oxygen of the atmosphere. The peroxide of mercury uniting with the undecomposed nitric acid forms *pernitrate of mercury*,* which is obtained in the form of a white mass by evaporating the solution. When this is dried and exposed to heat, the nitric acid is driven off, and *peroxide of mercury* remains. It is, however, to be remarked, that all the acid cannot be conveniently expelled, without at the same time decomposing the peroxide of mercury. As a small portion of acid is therefore left with the oxide, it has been called a subnitrate; but it is rather, as Mr. Brande calls it, "*peroxide of mercury with a small portion of adhering nitrate.*"

The red vapour alluded to is owing to the nitric acid being resolved into oxygen and nitric oxide as soon as it is expelled from the nitrate; because this acid cannot exist without water, or a base, and the nitric oxide uniting with the oxygen of the atmosphere forms *nitrous acid vapour*.

This preparation is peroxide of mercury with some nitrate of mercury, as just explained, and the reason that it differs in colour from the true peroxide, the *hydrargyri oxydum rubrum*, is owing to the presence of the nitrate of mercury.

PROP.—This preparation is confined to external use as an escharotic for destroying fungus, and as a stimulant to old sores. Gr. ss. in fine powder, mixed with a little sugar, and blown into the eye, removes specks of the cornea. Mixed with lard, it forms a useful dressing for chancres, &c.

OFF. PREP.—*Unguentum Hydrargyri Nitrico-oxidi.*

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* When mercury is dissolved in nitric acid by means of heat, as above, *pernitrate of mercury* is obtained; but when the metal is dissolved in the cold acid, then only *protonitrate* of mercury is produced.

HYDRARGYRI OXYDUM CINEREUM.

GREY OXIDE OF MERCURY.

Recipe	unciam	Submuriatis	Hydrargyri;
Take	*an ounce*	*of the Submuriate*	*of Mercury;*

congium	Liquoris	Calcis;
a gallon	*of the Solution*	*of Lime;*

Coque	Submuriatem Hydrargyri	in Liquore
Boil	*the Submuriate of Mercury*	*in the Solution*

Calcis,	movens	assiduè,	donec	Oxydum cinereum
of Lime,	*stirring*	*constantly,*	*until*	*the grey Oxide*

Hydrargyri	subsidat.	Lava	hoc	Aquâ destillatâ;
of Mercury	*subsides.*	*Wash*	*this*	*in distilled Water;*

deinde	exsicca.
then	*dry (it).*

The chlorine of the calomel unites with the hydrogen of the water, and forms *muriatic acid*, which combining with the lime forms *muriate of lime* in solution, while the oxygen of the water unites with the mercury forming *protoxide of mercury*, which is precipitated.

This preparation is, however, not a pure protoxide of mercury, but consists of a mixture of calomel and protoxide.

The *black wash*, employed as a lotion for venereal sores, is made by adding calomel to lime-water, and the *yellow wash* for similar purposes is formed by adding corrosive sublimate (*the perchloride of mercury*) to lime-water. The decomposition in the latter case is very similar to that just explained, the difference merely consisting in the two atoms of chlorine in the perchloride decomposing two atoms of water, and forming two atoms of muriatic acid, which with the lime forms muriate of lime, while the two atoms of oxygen of the decomposed water combine with the mercury forming *peroxide of mercury*, which is precipitated.

PROP.—Alterative.—DOSE, gr. j. to gr. iij. twice a-day, in form of pill.

HYDRARGYRI OXYDUM RUBRUM.

RED OXIDE OF MERCURY.

Recipe libram, pondere, Hydrargyri purificati;
Take a pound, by weight, of purified Mercury;

Immitte Hydrargyrum in altum, vitreum vas,
Put the Mercury into a tall, glass vessel,

cui sit os angustum, et
to which there should be a narrow mouth, and

latior fundus; adhibe huic aperto vasi calorem
a broader base; apply to this open vessel a heat

gradûs sexcentesimi, donec Hydrargyrum
of the six-hundredth degree, until the Mercury

abierit in rubras squamas; dein tere
shall have formed into red scales; then rub (it)

in pulverem subtilissimum.
into a very fine powder.

The mercury being volatilized by heat absorbs oxygen from the air, and is converted into the state of *peroxide*.

It requires several weeks to oxidize only a small quantity of mercury in this manner. For the success of the operation it is necessary to employ a vessel with a broad base, terminating in a long narrow neck, to prevent the mercury from flying off. The vessel should be placed in a sand bath, and the requisite degree of heat kept up. This is one of the many preparations in the pharmacopœia whose situation ought to be removed to the *Materia Medica*.

PROP.—Antisyphilitic. This preparation being extremely active requires great caution in administering it internally; it is, therefore, not often resorted to. Externally, it is escharotic and stimulant, and is employed in the same cases as the *Hydrargyri nitrico-oxydum.*—Dose, gr. $\frac{1}{8}$., night and morning, cautiously increased to gr. j. in form of pill, combined with opium.

HYDRARGYRI OXYMURIAS.

OXYMURIATE OF MERCURY.

Recipe libras duas, pondere, Hydrargyri purificati,
Take two pounds, by weight, of purified Mercury,

uncias triginta, pondere, Acidi sulphurici;
thirty ounces, by weight, of sulphuric Acid;

libras quatuor exsiccatæ Muriatis Sodæ.
four pounds of dried Muriate of Soda.

Coque Hydrargyrum cum Acido sulphurico
Boil the Mercury with the sulphuric Acid

in vase vitreo, donec Sulphas Hydrargyri
in a glass vessel, until the Sulphate of Mercury

exsiccata fuerit; contere hanc, ubi
shall be dried; triturate this, when

refrixerit, cum Muriate Sodæ in
it shall have cooled, with the Muriate of Soda in

mortario fictili; tum sublima ex cucurbitâ vitreâ,
an earthen mortar; then sublime from a glass cucurbit,

calore sensim aucto.
the heat gradually being increased.

When the mercury and sulphuric acid are boiled together, part of the acid is decomposed; the mercury unites with part of its oxygen, and is converted into *peroxide*, which unites with the undecomposed portion of sulphuric acid, and forms *bipersulphate of mercury*, while the other portion of the decomposed acid escapes in the state of *sulphurous acid gas.*

When the bipersulphate of mercury is sublimed with the common salt, the chlorine of the common salt combines with the mercury of the bipersulphate, and forms *perchloride of mercury*, while the oxygen of the peroxide of mercury of the bipersulphate unites with the sodium of the common salt, and forms *soda*, which unites with the sulphuric acid, and forms *sulphate of soda*. The perchloride of mercury being volatile is separated by sublimation from the sulphate of soda, which is not volatile.

Composed of 2 atoms chlorine, and 1 atom mercury.

Prop.—This is one of the most virulent of the metallic poisons, but in proper doses it is stimulant and alterative. It cannot be depended upon as a cure in syphilis. It may be employed with advantage in chronic rheumatism, lepra, and other cutaneous diseases. It chiefly acts by increasing the secretion of urine. Dissolved in a solution of muriate of ammonia, it forms an useful application for venereal warts.—Dose, gr. $\frac{1}{8}$. to gr. $\frac{1}{4}$., in form of pill with crumbs of bread.

Off. Prep.—*Liquor Hydrargyri Oxymuriatis; Hydrargyrum præcipitatum album.*

LIQUOR HYDRARGYRI OXYMURIATIS.

SOLUTION OF OXYMURIATE OF MERCURY.

Recipe grana octo Oxymuriatis Hydrargyri;
Take eight grains of the Oxymuriate of Mercury;

fluiduncias quindecim Aquæ destillatæ; fluidunciam
fifteen fluid-ounces of distilled Water; a fluid-ounce

Spiritûs rectificati;
of rectified Spirit;

Liqua Oxymuriatem Hydrargyri in Aquâ destil-
Dissolve the Oxymuriate of Mercury in the distil-

latâ, que adjice Spiritum ei.
led Water, and add the Spirit to it.

Chlorides dissolved in water become *muriates*, as explained at page 118. Perchloride of mercury dissolved in water is therefore converted into bipermuriate of mercury. The perchloride is dissolved in the above solution in the proportion of gr. ss. to f℥j.

This solution soon decomposes when exposed to the light, and calomel is precipitated. It is best to prepare it extemporaneously.

Prop.—It may be administered in Doses of fℨss. to fℨij. as an antisyphilitic, and in smaller doses as an alterative. Diluted with two parts of water, it forms an useful gargle in venereal sore throats; and with one part of water, it may be employed as a lotion in scabies and tetters; and when diluted to a considerable extent with water, it may be used as an injection in gonorrhœa.

HYDRARGYRUM PRÆCIPITATUM ALBUM.

WHITE PRECIPITATED MERCURY.

Recipe libram dimidiam Oxymuriatis
Take half a pound of the Oxymuriate

Hydrargyri; uncias quatuor Muriatis
of Mercury; four ounces of the Muriate

Ammoniæ; octarium dimidium Liquoris
of Ammonia; half a pint of the Solution

Subcarbonatis Potassæ; octarios quatuor
of Subcarbonate of Potash; four pints

Aquæ destillatæ;
of distilled Water;

Primò liqua Muriatem Ammoniæ, dein
First dissolve the Muriate of Ammonia, then

Oxymuriatem Hydrargyri, in Aquâ destillatâ,
the Oxymuriate of Mercury, in the distilled Water,

et adjice his Liquorem Subcarbonatis
and add to these the Solution of Subcarbonate

Potassæ. Lava pulverem demissum, donec
of Potash. Wash the precipitated powder, until

fuerit expers saporis; tum exsicca.
it shall be devoid of taste; then dry (it).

By dissolving muriate of ammonia and perchloride of mercury in water, we obtain a solution of *muriate of ammonia* and *bipermuriate of mercury*. On adding to this the solution of subcarbonate of potash, the potash abstracts the muriatic acid of the bipermuriate and muriate of potash is formed in solution, and a triple compound of *muriate of ammonia* and *peroxide of mercury* is precipitated. The carbonic acid of the potash escapes in a *gaseous* state.

Composed of peroxide of mercury, ammonia, and muriatic acid.

Prop.—This preparation is confined to external use for curing the itch, and for the extermination of pediculi. The best mode of applying it is to form it into an ointment with lard.

Off. Prep.—*Unguentum Hydrargyri præcipitati albi.*

HYDRARGYRUM PURIFICATUM.

PURIFIED MERCURY.

Infunde Hydrargyrum in retortam ferream, et
Pour the Mercury into an iron retort, and

igne subjecto, destillet Hydrargyrum purificatum.
fire being applied, let the purified Mercury distil.

By distilling mercury in this manner it is separated from any other metals with which it may be contaminated.

Mercury has already been noticed in the *Materia Medica*.

HYDRARGYRI SUBMURIAS.

SUBMURIATE OF MERCURY.

Recipe libras quatuor, pondere, Hydrargyri purificati;
Take four pounds, by weight, of purified Mercury;

uncias triginta, pondere, Acidi sulphurici; libram
thirty ounces, by weight, of sulphuric Acid; a pound

cum semisse Muriatis Sodæ;
with half (a pound) of the Muriate of Soda;

uncias octo Muriatis Ammoniæ;
eight ounces of the Muriate of Ammonia;

Coque libras duas Hydrargyri cum sulphu-
Boil two pounds of the Mercury with the sul-

rico Acido in vase vitreo, donec Sulphas
phuric Acid in a glass vessel, until the Sulphate

Hydrargyri exsiccata fuerit; ubi
of Mercury shall have become dried; when

refrixerit contere hanc cum libris duabus
it shall have cooled triturate this with two pounds

Hydrargyri, in mortario fictili, ut misceantur
of Mercury, in an earthen mortar, that they may be mixed

optimè. Dein adjice Muriatem Sodæ, et
well. Then add the Muriate of Soda, and

tere simul, donec globuli conspiciantur
rub (them) together, until globules are seen

non ampliùs; tum sublima. Contere Sublimatum
no longer; then sublime. Triturate the Sublimate

in pulverem subtilissimum, transmitte per cribrum,
into a very fine powder, pass (it) through a sieve,

et misce diligenter cum Muriate Ammoniæ,
and mix (it) diligently with the Muriate of Ammonia,

prius liquefactâ congio Aquæ destillatæ ferventis.
first dissolved in a gallon of boiling distilled Water.

Sepone ut pulvis subsidat. Effunde
Set (it) aside that the powder may subside. Pour off

liquorem, et ablue pulverem sæpiùs fervente
the liquor, and wash the powder frequently in boiling

destillatâ Aquâ, donec Liquore Ammoniæ
distilled Water, until Solution of Ammonia

instillato nihil dejiciatur. Denique,
being dropped in nothing be thrown down. Lastly,

fiat pulvis subtilissimus, eodem modo
let a very fine powder be made, in the same manner

quo præcepimus Cretam preparari.
in which we have ordered Chalk to be prepared.

If the student has made himself acquainted with the decomposition which takes place in forming corrosive sublimate, he will readily understand, that by triturating bipersulphate of mercury (which consists of 1 atom of peroxide of mercury and 2 atoms of sulphuric acid) with metallic mercury and common salt, the metallic mercury abstracts oxygen from the peroxide of mercury of the bipersulphate, reducing it to protoxide, which with the sulphuric acid forms protosulphate of mercury. This protosulphate being acted upon by the common salt, a protochloride of mercury is the result instead of a perchloride. For in forming corrosive sublimate the 2 atoms of oxygen of the peroxide of mercury of the bipersulphate are supplanted by 2 atoms of chlorine; in the latter case, the place of the 1 atom of oxygen of the protoxide of the protosulphate is supplied by 1 atom of chlorine.

The muriate of ammonia is used for the purpose of dissolving any corrosive sublimate that might perchance be formed with the calomel. When the solution of ammonia produces no precipitate, it shews that the whole of the corrosive sublimate is removed, and that the calomel is pure. Calomel is protochloride of mercury, being composed of 1 atom chlorine and 1 atom mercury.

Prop.—Antivenereal, alterative, deobstruent, aperient, antispasmodic. This preparation of mercury may be depended upon in syphilis. As an alterative and deobstruent, it may be given with considerable advantage in a variety of diseases. It forms an useful purgative in combination with colocynth, jalap, &c. In dropsies, it assists the action of squill and digitalis. In hydrocephalus, croup, &c. it is a medicine on which much reliance may be placed, and its exhibition in cases of this kind must be followed up by repeating the dose every three hours, until some visible effect be produced. —Dose, to produce ptyalism, gr. j. to gr. ij. may be given night and morning: should it act on the bowels it may be conjoined with opium. From gr. iv. to gr. viij. act as a purgative; but, as an alterative, gr. ss., repeated at proper intervals, will often be found efficient.

HYDRARGYRI SULPHURETUM NIGRUM.

BLACK SULPHURET OF MERCURY.

Recipe libram, pondere, Hydrargyri purificati;
Take a pound, by weight of purified Mercury;

libram Sulphuris sublimati;
a pound of sublimed Sulphur;

Tere simul donec globuli conspiciantur
Rub (them) together until globules are seen

non ampliùs.
no longer.

Protosulphuret of mercury consists of

1 atom sulphur	= 16
1 atom mercury	= 200
	216

As more sulphur is ordered in the above formula than is necessary to form protosulphuret of mercury, the compound probably consists of protosulphuret of mercury with some uncombined sulphur. There is, however, some difference of opinion respecting the nature of this preparation: according to Mr. Brande, it consists of red sulphuret of mercury and sulphur.

PROP.—Alterative and anthelmintic, but not to be depended upon.—DOSE, gr. v. to ʒss. two or three times a-day.

HYDRARGYRI SULPHURETUM RUBRUM.

RED SULPHURET OF MERCURY.

Recipe Hydrargyri purificati,' pondere, quadraginta
Take of purified Mercury, by weight, forty

uncias; Sulphuris sublimati uncias octo;
ounces; of sublimed Sulphur eight ounces;

Misce Hydrargyrum cum Sulphure liquefacto
Mix the Mercury with the Sulphur dissolved

ad ignem, et quamprimùm massa intumescat,
upon the fire, and as soon as the mass swells,

remove vas ab igne, et tege fortiter,
remove the vessel from the fire, and cover (it) strongly,

ne inflammatio fiat; deinde tere
lest inflammation should take place; then rub (it)

in pulverem, et sublima.
into a powder, and sublime (it).

By the above method we obtain *persulphuret of mercury*, which is composed of 2 atoms sulphur, and 1 atom mercury. As thus procured it is called *factitious cinnabar*. It is remarkable that the colour of this compound is rendered much more beautiful by reducing it to a powdered state, when it forms the pigment termed *vermilion*. Native cinnabar is the ore from which metallic mercury is chiefly obtained. See *Mercury* in the *Materia Medica.*

Prop.—Alterative and deobstruent. Seldom employed.—Dose, gr. x. to ʒss. in form of bolus.

PRÆPARATA E PLUMBO.

PREPARATIONS FROM LEAD.

There are three combinations of lead with oxygen, but only the first or *protoxide* unites with acids to form the salts of lead. These oxides are constituted as follows:

	Lead.		Oxygen.		Weight of Atom.
Protoxide (*yellow*) *	104		8	=	112
Deutoxide (*red*) †........	104		12	=	116
Peroxide (*puce colour*)	104	+	16	=	120

PLUMBI ACETAS.

ACETATE OF LEAD.

Recipe libram Subcarbonatis Plumbi; octarium
Take a pound of the Subcarbonate of Lead; a pint

Acidi acetici fortioris; octarium cum semisse
of the stronger acetic Acid; a pint with half (a pint)

Aquæ destillatæ ferventis;
of boiling distilled water;

Misce Acidum cum Aquâ; adjice his
Mix the Acid with the Water; add to these

* *Massicot* of commerce.
† *Red lead* of commerce.

paulatim Subcarbonatem Plumbi, et coque
gradually the Subcarbonate of Lead, and boil

donec Acidum saturetur; deinde cola per
until the Acid be saturated; then strain through

chartam, et, Aquâ consumptâ donec
paper, and, the Water being evaporated until

pellicula subnascatur, sepone ut crystalli
a pellicle floats, set (it) aside that crystals

fiant. Effuso liquore, exsicca
may be formed. The liquor being poured off, dry

has super chartam bibulam.
these upon blotting paper.

That which is called by the College *sub*carbonate of lead is a *carbonate*, composed of 1 atom carbonic acid, and 1 atom protoxide of lead. On adding vinegar to this, the acetic acid unites with the protoxide of lead, forming *acetate of lead* in solution, and the carbonic acid of the carbonate escapes in the state of *gas*. By evaporating the solution, crystals are obtained.

Composed of 1 atom acetic acid, and 1 atom protoxide of lead. The crystals contain 3 atoms of water, and are slowly efflorescent when exposed to the air.

This salt, which is commonly called *sugar of lead*, is generally made on the large scale, and it might therefore very properly be transferred to the *Materia Medica*.

Prop. Sedative, astringent. It may be exhibited with advantage in hœmorrhages from the lungs, uterus, and intestines; but it requires to be given with caution. Some practitioners are in the habit of prescribing a mixture of sulphate of magnesia and infusion of roses along with it, not being aware that sulphate of lead is formed, which is inert. Gr. x., or more, dissolved in f℥viii. of distilled water, forms a useful collyrium in ophthalmia. A little dilute acetic acid may be added to prevent decomposition, when distilled water is not at hand.—Dose, gr. ss. every six or eight hours, made into a pill with crumbs of bread, to which a small quantity of opium may be added.

OFF. PREP.—*Ceratum Plumbi Acetatis.*

LIQUOR PLUMBI SUBACETATIS.

SOLUTION OF SUBACETATE OF LEAD.

Recipe libras duas Oxydi semivitrei Plumbi;
Take two pounds of the semivitreous Oxide of Lead;

congium Acidi acetici diluti:
a gallon of dilute acetic Acid;

Misce, et decoque ad octarios sex, movens
Mix, and boil down to six pints, stirring

assiduè; dein sepone, ut fæces subsidant,
constantly; then set aside, that the dregs may subside,

et cola.
and strain.

The acetic acid of the distilled vinegar unites with part of the protoxide of lead employed, and a *subacetate of lead* is formed in solution.

The subacetate crystallizes in white plates by evaporation. According to Berzelius this subsalt is composed of 1 atom of acid, and 3 atoms of oxide of lead, and is consequently a *tris*acetate.*

PROP.—This preparation is confined to external use. It forms a cooling discutient lotion when diluted with distilled water, which may be advantageously applied in cases of burns and phlegmonous inflammation.

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* Numerals derived from the Latin are employed to express the number of atoms of acid in a *super*salt, and to express the number of atoms of base in a *sub*salt, the Greek numerals *dis*, *tris*, *tetrakis* are recommended to be prefixed by Dr. Thomson.

LIQUOR PLUMBI SUBACETATIS DILUTUS.

DILUTED SOLUTION OF THE SUBACETATE OF LEAD.

Recipe fluidrachmam Liquoris Subacetatis
Take a fluid-dram of the Solution of the Subacetate

Plumbi; octarium Aquæ destillatæ; fluidrachmam
of Lead; a pint of distilled Water; a fluid-dram

Spiritûs tenuioris;
of proof Spirit;

Misce.
Mix.

Prop.—The same as those of the former preparation. This formula might very well be dispensed with.

PRÆPARATA E ZINCO.

PREPARATIONS FROM ZINC.

There is only one definite oxide of zinc, which is white. It unites with acids forming salts, and is composed of

1 atom zinc	=	34
1 atom oxygen......	=	8
		42

CALAMINA PRÆPARATA.

PREPARED CALAMINE.

Ure Calaminam; tum contere. Deinde
Burn the Calamine; then triturate (it). Afterwards

fiat pulvis subtilissimus eodem modo
let a very fine powder be made in the same manner

quo præcepimus Cretam præparari.
in which we have directed Chalk to be prepared.

Calamine has been already described in the *Materia Medica.* By the above mentioned process it is freed from impurities, and is obtained in the state of fine powder.

PROP.—Calamine in the state of fine powder is chiefly employed to sprinkle over excoriated surfaces, and ulcers attended with an ichorous discharge, for the purpose of absorbing the moisture. It does not interfere with any other dressing it may be necessary to apply.

OFF. PREP.—*Ceratum Calaminæ.*

ZINCI OXYDUM.

OXIDE OF ZINC.

Recipe libram Sulphatis Zinci; octarium
Take a pound of the Sulphate of Zinc; a pint

Liquoris Ammoniæ, vel quantum sit
of the Solution of Ammonia, or as much as may be

satis; octarium Aquæ destillatæ;
sufficient; a pint of distilled Water;

Liqua Sulphatem Zinci in Aquâ destillatâ,
Dissolve the Sulphate of Zinc in the distilled Water,

et adjice quantum sit satis Liquoris
and add as much as may be sufficient of the Solution

Ammoniæ, ut Oxydum Zinci dejiciatur
of Ammonia, that the Oxide of Zinc may be throw down

penitùs. Liquore effuso, ablue
thoroughly. The liquor being poured off, wash

pulverem sæpius Aquâ destillatâ, et exsicca
the powder frequently in distilled Water, and dry (it)

balneo arenæ.
in a bath of sand.

The ammonia uniting with the sulphuric acid of the sulphate, precipitates the *oxide of zinc*, the *sulphate of ammonia* being held in solution. By adding the *liquor ammoniæ* in excess the precipitate would be re-dissolved.

PROP.—Tonic, antispasmodic. In chorea, epilepsy, &c.—DOSE, gr. j. to gr. vj. twice a-day.

OFF. PREP.—*Unguentum Zinci.*

ZINCI SULPHAS.

SULPHATE OF ZINC.

Recipe uncias quatuor frustulorum Zinci;
Take four ounces of small pieces of Zinc;

uncias sex, pondere, Acidi sulphurici; quatuor
six ounces, by weight, of sulphuric Acid; four

octarios Aquæ destillatæ;
pints of distilled Water;

Misce in vase vitreo, et, finitâ effervescentiâ,
Mix in a glass vessel, and, effervescence being finished,

cola liquorem per chartam; tum decoque,
strain the solution through paper; then boil (it) down,

donec pellicula subnascatur, et sepone ut
until a pellicle rises, and set (it) aside that

crystalli fiant.
crystals may be formed.

Part of the water is decomposed, its oxygen unites with the zinc, forming *oxide of zinc*, which combines with the sulphuric acid forming *sulphate of zinc*, which is held in solution, and the hydrogen of the water escapes in the form of *gas*. Crystals of the sulphate are yielded after due evaporation.

Composed of 1 atom sulphuric acid, and 1 atom oxide of zinc. The crystals contain 7 atoms of water. Although this salt is neutral, it reddens litmus paper.

Prop.—Tonic, astringent, and in large doses emetic. On account of its rapid operation as an emetic, it is generally resorted to in cases of poisoning by opium, &c. In large doses it is poisonous. Dissolved in the proportion of gr. j. to f℥j. of distilled or rose water, it forms an excellent collyrium in chronic ophthalmia, and an injection in the obstinate latter stage of gonorrhoea.—Dose, as a tonic, gr. j. to gr. ij. twice a-day; as an emetic, ℈j. to ʒss. dissolved in water.

Off. Prep.—*Liquor Aluminis comp.*

SULPHUREA.

PREPARATIONS FROM SULPHUR.

Sulphur is described in the *Materia Medica*, and in the *Introduction*.

OLEUM SULPHURETUM.

SULPHURETED OIL.

Recipe uncias duas Sulphuris loti; octarium
Take two ounces of washed Sulphur; a pint

Olei Olivæ;
of the Oil of Olive;

Injice Sulphur paulatim Oleo calefacto
Throw the Sulphur gradually to the Oil heated

in vase ferreo peramplo,	et	move	assiduè
in a very large iron vessel,	*and*	*stir*	*constantly*

spathâ,	donec	coïerint.
with a spatula,	*until*	*they shall have united.*

From the strong disagreeable odour of this preparation, it is evident that during the operation some chemical change takes place, the nature of which is not understood. Formerly called *balsam of sulphur.*

Prop.—Stimulant, and externally, detergent. It used to be given in asthmas, &c. but it is now laid aside. Sometimes employed locally for cleansing foul ulcers.—Dose, ♏v. to ♏xxx.

POTASSÆ SULPHURETUM

SULPHURET OF POTASH.

Recipe	unciam	Sulphuris loti;	uncias duas
Take	*an ounce*	*of washed Sulphur;*	*two ounces*

Subcarbonatis	Potassæ;
of the Subcarbonate	*of Potash;*

Tere	simul,	et	impone	super ignem
Rub them	*together,*	*and*	*place (them)*	*upon the fire*

in crucibulo clauso,	donec	coïerint.
in a covered crucible,	*until*	*they shall have united.*

The carbonic acid of the subcarbonate is expelled in the form of *gas*, and part of the potash is decomposed by part of the sulphur uniting with its oxygen, and forming *sulphuric acid*, which unites with the undecomposed part of the potash forming *sulphate of potash;* the remaining portion of the sulphur unites with the potassium of the decomposed potash, and *sulphuret of potassium* is produced. This preparation, therefore, consists of *sulphate of potash* and *sulphuret of potassium*, and ought to have been placed with the preparations of potash.

PROP.—Expectorant, diaphoretic. It is a medicine, however, on which little reliance can be placed. Externally, it has been employed on the continent for the cure of scabies, in the form of bath or ointment; the latter is made by mixing it with soap and oil.—DOSE, gr. ij. to gr. iv. made into pills with soap. In doses of from gr. v. to gr. x. combined with the usual dose of conium, it is said to afford relief in cancerous affections.

SULPHUR LOTUM.

WASHED SULPHUR.

Recipe libram Sulphuris sublimati;
Take a pound of sublimed Sulphur;

Superinfunde Aquam ferventem, ut Acidum,
Pour upon (it) boiling Water, that the Acid,

si sit quod, abluatur penitùs;
if there be any, may be washed away thoroughly;

dein sicca.
then dry.

During the process of subliming sulphur, a portion of it is liable to become acidified by uniting with the oxygen of the air contained in the aparatus, and the object of washing it, is to remove the adhering sulpurous acid thus formed.

Sulphur is one of the elementary bodies. Its weight of atom is 16.

PROP.—Mildly aperient, acting on the whole course of the intestinal canal. It is also a stimulating diaphoretic. In scabies, &c. it may be given internally and applied externally at the same time. It is an useful laxative in hæmorrhoidal cases. Its aperient properties are assisted by combining it with supertartrate of potash.—DOSE, ʒj. to ʒiij. given either in milk, or made into an electuary with confection of senna, &c.

SULPHUR PRÆCIPITATUM.

PRECIPITATED SULPHUR.

Recipe libram Sulphuris sublimati; libras duas
Take a pound of sublimed Sulphur; two pounds

Calcis recentis; congios quatuor Aquæ;
of fresh Lime; four gallons of Water;

Coque Sulphur et Calcem simul in Aquâ;
Boil the Sulphur and the Lime together in the Water;

tum cola liquorem per chartam, que instilla ei
then strain the solution through paper, and drop to it

quantum sit satis Acidi muriatici, ut
as much as may be sufficient of muriatic Acid, that

Sulphur demittatur. Denique, aquâ
the Sulphur may be thrown down. Lastly, water

superinfusâ sæpius, lava hoc donec
being poured thereon frequently, wash this until

fiat insipidum.
it becomes tasteless.

Part of the water is decomposed, its hydrogen unites with part of the sulphur, forming *sulphuretted hydrogen*, which combining with part of the lime forms *hydrosulphuret of lime* in solution, with excess of sulphur. The oxygen of the water unites with another portion of the sulphur, and probably forms *hyposulphurous acid*, which combines with another part of the lime, forming *hyposulphite of lime* in solution. On adding the muriatic acid, *muriate of lime* is formed in solution, and a large quantity of sulphur is precipitated, and the greater part of the sulphuretted hydrogen, instead of being given off in a gaseous state, as would be expected, is retained by some of the sulphur: in a few minutes, a yellowish oily semifluid is seen at the bottom of the vessel, which is *bisulphuretted hydrogen*. The hyposulphite of lime is also decomposed, and as hyposulphurous acid cannot exist in a free state, on leaving its base, it is resolved into sulphur and sulphurous acid. There are a variety of opinions respecting the nature of this decomposition.

The sulphur in precipitation combines with 1 atom of water, which is the cause of its white appearance. It is therefore a *hydrate*. It is only in this respect, and in its minute state of division that it differs from the *sulphur lotum*.

PROP.—It possesses no advantage as a medicine over *sulphur lotum*, except that its being in a more minute state of division renders it readily miscible with other articles with which it may be necessary to compound it.

VEGETABILIA.

VEGETABLES.

VEGETABILIA sunt decerpenda ex locis
Vegetables are to be gathered from the situations

et solo, ubi nascuntur sponte,
and soil, where they grow spontaneously,

tempestate siccâ, nec madefacta imbribus, nec
in a dry season, neither made wet with showers, nor

rore; sunt colligenda quotannis; et
with dew; they are to be collected yearly; and

quæ servata fuerint diutiùs,
those which shall have been kept longer

rejicienda.
(*are*) *to be thrown away.*

Pleræque radices sunt effodiendæ antequam
Most roots are to be dug up before

caules aut folia exserant.
the stems or leaves shoot forth.

Cortices debent colligi eâ tempestate
Barks ought to be collected in that season

quâ possint separari facillimè
in which they are able to be separated most easily

a ligno.
from the wood.

Folia sunt decerpenda postquam flores
Leaves are to be gathered after the flowers

expassi fuerint; et antequam semina
shall have expanded; and before the seeds

maturescant.
are ripe.

Flores sunt legendi nuper explicati.
Flowers are to be gathered when lately unfolded.

Semina sunt colligenda jam matura, et
Seeds are to be collected when just ripe, and

antequam inceperint decidere è plantâ.
before they shall have begun to fall from the plant.

Hæc debent servari in propriis pericarpiis.
These ought to be kept in (their) proper seed vessels.

VEGETABILIUM PRÆPARATIO.

PREPARATION OF VEGETABLES.

Exsicca Vegetabilia, brevi postquam
Dry Vegetables, shortly after

decerpta fuerint, leviter strata (illis
they shall have been gathered, lightly spread out (those

exceptis quæ oportet esse recentia),
being excepted which ought to be fresh,

quàm citissimè, calore tam leni ut
as soon as possible, with a heat so gentle that

color non mutetur; dein conserva
the colour may not be changed; then preserve (them)

in locis vel vasis aptis, intercluso accessu
in places or proper vessels, excluded from the access

luminis et humoris.
of light and moisture.

Reconde RADICES, quas præcepimus servari
Bury Roots, which we have ordered to be kept

recentes, in arenâ siccâ. Seca RADICEM SCILLÆ
fresh, in dry sand. Cut the Root of Squill

transversim in laminas tenues ante exsiccationem,
transversely into thin slices before the drying,

tunicis aridis direptis.
the dried coats being taken away.

Sepone FRUCTUS PULPOSOS, si sint immaturi,
Set aside pulpy Fruits, if they be unripe,

vel maturi et sicci, in loco humido, ut
or ripe and dry, in a moist place, that

mollescant; dein exprime pulpas
they may soften; then press out the pulps

per cribrum setaceum; postea coque
through a hair sieve; afterwards boil

lento igne, movens crebrò. Denique, consume
with a slow fire, stirring frequently. Lastly, evaporate

aquam balneo aquoso, donec pulpæ fiant
the water in a water bath, until the pulps become

idoneæ crassitudinis.
of a proper consistence.

Superinfunde aquam ferventem Lomentis contusis
Pour boiling water to the bruised Pods

Cassiæ, ut pulpa eluatur, quam
of Cassia, that the pulp may be washed out, which

exprime primùm per cribrum grandioribus foraminibus,
express first through a sieve with larger holes, (*and*)

postea per setaceum; deinde consume
afterwards through a hair (*sieve*); *then evaporate*

aquam balneo aquoso donec pulpa habeat
the water in a water bath until the pulp acquires

idoneam crassitudinem.
a proper consistence

Exprime pulpam vel succum
Press out the pulp or juice

fructuum maturorum et recentium per cribrum,
of ripe and recent fruits through a sieve,

nullâ coctione adhibitâ.
no boiling being applied.

GUMMI-RESINÆ.

GUM-RESINS.

Separa Opium quàm diligentissimè
Separate Opium as carefully as possible

a rebus alienis, præsertim externis.
from extraneous things, especially from (*those*) *external.*

Servetur Opium Molle, quod sit aptum
Let Opium be kept Soft, which may be fit

ad fingendas pilulas; et Durum, quod fuerit
to form pills; and Hard, which shall have been

ita exsiccatum balneo aquoso ut possit
so dried in a water bath that it may be able

teri in pulverem.
to be rubbed into powder.

Gummi-Resinæ sunt habendæ pro optimis,
(Those) Gum Resins are to be accounted as best,

quæ electæ fuerint adeo sinceræ ut
which shall have been chosen so unmixed that

sit opus nullâ purificatione. Quod si
there may be occasion for no purification. But if

videantur esse minus puræ, coque in aquâ
they appear to be less pure, boil [them] in water

donec mollescant, et prelo exprime
until they become soft, and with a press express

per pannum cannabinum; dein sepone, ut
through canvass cloth; then set aside, that

pars resinosa subsidat. Consume
the resinous part may subside. Evaporate

liquorem supernatantem, effusum, balneo aquoso,
the supernatant liquor, poured off, in a water bath,

parte resinosâ adjectâ sub finem, ut
the resinous part being added towards the end, that

coeat in unum cum parte gummosâ.
it may unite into one with the gummy part.

Gummi-Resinæ facilè liquescentes possunt purificari
Gum Resins easily liquified may be purified

injiciendo in vesicam bubulam, que
by throwing (them) into ox's bladder, and

tenendo in aquâ fervente, donec fiant
holding (them) in boiling water, until they become

adeò molles, ut possint separari à sordibus
so soft, that they may be separated from impurities

prelo per pannum cannabinum.
by a press through canvass cloth.

Liqua BALSAMUM STYRACIS in Spiritu rectificato,
Dissolve the Balsam of Storax in rectified Spirit,

et cola; tum leni calore destillet Spiritus,
and strain; then with a gentle heat let the Spirit distil,

donec idonea crassitudo fiat balsamo.
until a proper consistence be formed in the balsam.

All matter of vegetable origin is found to consist of two or more of the following elements, viz. *carbon*, *oxygen, hydrogen*, and *nitrogen*. The last of these is by far the least abundant, and is only occasionally met with.

Those distinct substances which we meet with ready formed in plants, are called *proximate principles;* and these by ultimate analysis are capable of being resolved into some of the elements just enumerated, but *oxygen*, *hydrogen*, and *carbon* are generally the constituents.

Some of the proximate principles of plants, such as gum, are yielded spontaneously, while others can only be obtained by mechanical means, as in the separation of starch and gluten from flour; benzoic acid is separated from the gum-resin which contains it by sublimation; and some of the other principles are procured by processes strictly chemical.

§ 1. VEGETABLE ACIDS.

The principles derived from vegetables, which we shall first bring under consideration, are of the acid class: particular notice will be taken of those which demand the immediate attention of the medical pupil, while others of inferior note will only be generally described.

ACETIC ACID. This acid is found ready formed in the sap of some plants, either in a free state or in combination with potash, or lime. It is procured artificially, by subjecting vegetable matter to destructive distillation, as in the process of manufacturing vinegar from wood, which has already been described under the article *Acidum aceticum fortius* in the *Materia Medica*, and it is also the production of the acetous fermentation.*

The composition of this acid is described at page 80.

BENZOIC ACID is contained in gum benzoin, in the balsams of storax, Peru, and Tolu, and in some other vegetable substances. It has been obtained very plentifully from the urine of cows, and has also been discovered in that of children.

The manner of procuring this acid, and a statement of its composition, are given at pages 80, 81.

BOLETIC ACID exists in the juice of the *Boletus pseudo-ignarius*.

CAMPHORIC ACID. This acid is not the production of any plant. It is obtained by digesting camphor in nitric acid.

CARBAZOTIC ACID is an artificial production, formed by acting upon indigo with nitric acid. The *indigotic acid* is formed at the same time.

CITRIC ACID is contained abundantly in the juice of the lime and lemon, and in that of several other acidulous fruits. The manner of procuring it, &c. is described at page 81.

ELLAGIC ACID is an acid which is obtained during the process of making *gallic acid*. Its name is derived from the word *galle* reversed.

GALLIC ACID is found ready formed in combination with tannin in gall-nuts, and in the bark of several trees. The manner in which its combination with tannin exists is not understood. This acid was first discovered by Scheele in 1786.

Gallic acid is obtained in a variety of ways, but that of Scheele improved by Braconnot is considered the most economical. Digest galls, reduced to powder, in

* See *Vegetable Fermentation*.

four times their weight of water for a few days. Strain the infusion through linen, and let it stand exposed about two months in a tolerably warm situation. In the course of this period, the surface becomes mouldy, the tannin disappears, and a yellowish crystalline substance is thrown down, and by evaporating the liquor to the consistence of syrup, more of this substance is deposited when it cools. The gallic acid thus obtained contains colouring matter, and a peculiar acid termed *ellagic*. Ellagic acid is not soluble in boiling water, but the gallic acid is; these acids are therefore readily separated from each other. The solution of gallic acid is next deprived of its colouring matter by digesting it with animal charcoal, deprived of phosphate of lime by muriatic acid. The solution of gallic acid is then duly evaporated to enable crystals to form. Gallic acid is in white acicular crystals. It is composed of oxygen, hydrogen, and carbon, the proportions of which are not as yet determined. With bases it forms salts called *gallates*. In combination with tannin it forms *tanno-gallates*. The colouring matter of ink is *tanno-gallate of iron*.

HYDROCYANIC ACID OR PRUSSIC ACID. This acid is a vegetable production, being present in the bark of the *prunus padus* or bird-cherry, in the leaves of peach and nectarine trees, in bitter almonds, and the kernels of many fruits.

For chemical and medicinal purposes hydrocyanic acid is obtained artificially. The following is the formula of the Dublin College:—"Take of cyanuret of mercury one ounce; of muriatic acid seven fluid-drams; of water eight fluid-ounces. Let eight fluid-ounces distil from a glass retort into a cool receiver, and keep it in a well-stopped bottle, in a cool place, away from the light."

"The sp. gr. should be to that of distilled water as .998 to 1.000."

The proportions of ingredients employed at Apothecaries' Hall are 1 part of cyanuret of mercury, 1 part of muriatic acid of sp. gr. 1.15 and 6 parts of water.

The distillation is then carried on until the quantity produced is equal to the quantity of water employed. Any muriatic acid which comes over may be removed by adding chalk and distilling again.

The acid as thus produced is not the pure acid, but a solution of the acid in water. The pure acid may be obtained by putting cyanuret of mercury in a glass retort with two-thirds of its weight of highly concentrated muriatic acid, and applying heat. The vapour of hydrocyanic acid rises along with water and muriatic acid, and it is separated from the latter by causing it to pass through a narrow tube over fragments of marble, with the lime of which the muriatic acid unites. The water is removed by means of chloride of calcium, and the acid is eventually condensed in a tube surrounded with snow or ice.

The decomposition which takes place when cyanuret of mercury is acted upon by muriatic acid, is as follows: the cyanogen of the cyanuret unites with the hydrogen of the muriatic acid forming *hydrocyanic acid*, which distils over, and the mercury of the cyanuret unites with the chlorine of the muriatic acid, forming *perchloride of mercury;* or it may be described that the water is decomposed, its hydrogen uniting with the cyanogen, forming *hydrocyanic acid*, and its oxygen with the mercury, forming *peroxide of mercury*, which combines with the muriatic acid, forming *bipermuriate of mercury*. It is impossible to determine which of these theories is the true one, but corrosive sublimate is formed in solution, in consequence of the cyanuret of mercury being a *bi*-cyanuret composed of 2 atoms cyanogen and 1 atom mercury, and consequently decomposing either 2 atoms of the muriatic acid or 2 atoms of the water, and causing 2 atoms of chlorine from the muriatic acid, or 2 atoms of oxygen from the water, to combine in a nascent state with the mercury.

There are other methods of obtaining both the dilute and concentrated acid, which we have not room to notice here.

Pure hydrocyanic acid, which is not to be met with in the shops, is a limpid colourless fluid, having a strong odour of peach blossoms. Its sp. gr., at 45° F., is .7058. It is so extremely volatile that, in warm weather, its vapour may be collected over mercury. If a drop of it be placed upon a piece of glass, part of it evaporates so rapidly as to freeze the remaining portion. It soon begins to decompose after it is made, and can only be kept a very short time, but it may be preserved much longer when diluted with water. In either case it must be kept excluded from the light. It unites with water and alcohol in all proportions. It will not decompose carbonates. With bases it forms salts called *hydrocyanates* or *prussiates*, all of which, like itself, are powerfully poisonous. It is composed of

1 atom cyanogen	= 26
1 atom hydrogen	= 1
	27

Prop.—Powerfully sedative. It may be given in all cases in which sedatives are required; but it must be administered with caution. Dr. A. T. Thomson recommends it as a local application for allaying the itching and tingling so distressing in impetiginous affections, and says it is the only one which can be depended on in such cases.—Dose, of the *dilute acid*, as generally met with at Apothecaries' Hall and in the shops, from ♏ij. to ♏viij. in distilled water, or the almond mixture. An over-dose is best counteracted by hot brandy and water or ammonia. As a local application, it may be made into a lotion in the proportion of f℈j. of the acid to f℥iss. of distilled water. Sometimes it may be convenient to moisten a bread and water poultice with a lotion of this sort. The manner of detecting this acid, and of ascertaining its strength, are shewn in another place. See *Index*.

Igasuric Acid is found in combination with *strychnia* in the nux vomica, and St. Ignatius's bean; but it is doubtful whether it differs from all other known acids.

Indigotic Acid. See *Carbazotic acid*.

Kinic Acid. This acid exists in combination with cinchonia, quina, and lime, in cinchona bark. See page 187.

Malic Acid. This acid exists plentifully in the juice of apples, whence its name. It is also contained in several acidulous fruits, and is often found along with citric and tartaric acid. It exists in the berries of the service tree (*Sorbus aucuparia*), imparting to them their acidity, and when first detected in these, it was described under the name of *sorbic acid*. In the house-leek (*Sempervivum tectorum*), it is found in combination with lime. It may be procured from the berries of the service tree by a peculiar process, which it is not necessary to describe here. It is composed of oxygen, hydrogen, and carbon, and with bases forms salts called *malates*. When it is heated in close vessels it undergoes decomposition, and a new and volatile acid is produced which has been called *pyromalic acid*.

Meconic Acid. This acid is found in opium in combination with *morphia*. See page 190.

Mellitic Acid. A very rare substance called *honey-stone*, is sometimes met with in Germany, which is said to be a mellitate of alumina. When this is boiled in plenty of water, the mellitic acid dissolves and the alumina is precipitated. The acid is then procured from the solution, in crystals, by evaporation. Very little is known of this acid; but according to the analysis of Liebig and Wöhler, it consists of carbon and oxygen only.

Moroxylic or Moric Acid, exists in combination with lime on the bark of the white mulberry (*Morus alba*).

Mucic or Saccholactic Acid, was discovered by Scheele. It is formed by acting on gum, sugar of milk, manna, and some other substances with nitric acid. When gum is digested in about three times its weight of nitric acid, and heat applied, an effervescence takes place, and the *oxalic*, *malic*, and *saccholactic* acids are the result of the operation. The saccholactic acid, being insoluble, subsides in form of a white powder, and is separated and purified by subsequent manipulation. This is a weak acid. It is composed of oxygen, hydrogen, and carbon. When heated in a retort it is decomposed, giving rise to a volatile compound called *pyromucic acid.*

OXALIC ACID. This acid is found in several plants, but it generally occurs in combination with either potash or lime. The acidulous properties of the *Rumex acetosa* and *Oxalis acetosella* have already been described as dependent on binoxalate of potash. Oxalate of lime is found in several of the species of *lichen.*

Oxalic acid is generally obtained artificially by the action of nitric acid on sugar. But several other substances, such as starch, gum, oil, the vegetable acids, &c., also produce it when acted upon by nitric acid. —To a given quantity of sugar add five or six times its weight of nitric acid. The ingredients being placed in a retort, heat is to be applied. Part of the nitric acid is separated into oxygen and deutoxide of nitrogen; the sugar, which consists of oxygen, hydrogen, and carbon, is also decomposed. The whole of the hydrogen of the sugar unites with oxygen from the nitric acid, forming water; and part of the carbon also unites with oxygen, forming carbonic acid; and the remaining carbon of the sugar is left with oxygen in the requisite proportion for forming oxalic acid. Some acetic and malic acids are also produced during the operation. The distillation is to be carried on until the fluid matter in the retort is of about the consistence of syrup. When this cools, crystals of oxalic acid are obtained, which are to be re-dissolved and crystallized until they are obtained quite pure.

This acid is composed of

$$\left.\begin{array}{l}\text{2 atoms carbon} = 12\\ \text{3 atoms oxygen} = 24\end{array}\right\}\text{ or }\left\{\begin{array}{l}\text{1 atom carbonic oxide} = 14\\ \text{1 atom carbonic acid} \;\; = 22\end{array}\right.$$

$$\begin{array}{cc} \overline{36} & \overline{36} \end{array}$$

Its crystals contain 3 atoms of water.

It forms with bases a class of salts called *oxalates.* With potash it forms three salts, which are constituted as follows:

	Potash.		Oxalic Acid.
Oxalate of potash..........	48	+	36
Binoxalate of potash	48	+	72
Quadroxalate of potash	48	+	144

It is powerfully poisonous, and numberless accidents have occurred from the careless manner of keeping it, while at other times it has been intentionally resorted to for the purpose of suicide.

Prop. Dr. A. T. Thomson says, that "in *small* doses, dissolved in a large quantity of water sweetened with sugar, it forms an agreeable, cooling beverage, which may be used in febrile diseases, in the same manner and with the same intention as lemonade." But surely there can be no necessity for employing oxalic acid so long as our Materia Medica abounds with medicines that possess all the virtues of which this acid can boast, without partaking of its deleterious properties. What medical man would be foolish enough to trust any of the tribe of nurses to make acidulated drinks for his patients with so deadly a poison? Dr. T. also says it may be employed externally as a styptic.

Pectic Acid. Braconnot supposed this acid to exist in all plants, but he obtained it principally from the carrot. It has a remarkable tendency to gelatinize, whence its name from πηκτις, *coagulum*.

Rheumic Acid. This was obtained from the rhubarb of our gardens, and has been since proved to be *oxalic acid*.

Sorbic Acid, when first obtained from the berries of the service tree, was thought to be a distinct acid, but it is now proved to be the *malic acid*, which see.

Suberic Acid. This acid is generated by acting on cork with nitric acid.

Succinic Acid exists ready formed in amber, from which it is obtained by distillation.

Tartaric Acid is contained in the juice of several acidulous fruits. It is generally combined with either potash or lime. The manner of obtaining it, &c. is described at page 88.

Zumic Acid. Braconnot obtained this from vegetable substances, after the acetous fermentation had taken place. It is now proved to be the *acetic acid.*

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§ 2. VEGETABLE ALKALIES.

A class of proximate principles has been found to exist in certain plants, which, from their possessing alkaline properties, have been denominated *vegetable alkalies.** They all consist of *carbon*, *oxygen*, *hydrogen*, and *azote*, in different degrees of combination. They are readily decomposed by acting upon them with nitric acid or heat, and their destructive distillation always affords ammonia, proving the presence of the last of the four mentioned elements. These alkalies are found in the plant in combination with certain acids forming salts, and the mode of obtaining them is similar in all cases, it only being necessary to adopt certain modifications in the process according to circumstance.—That part of the vegetable. from which the alkali is to be obtained, is infused or macerated in plenty of water, by which means a solution of the vegetable salt is afforded, such salt being always soluble to a greater or less extent in water. The solution is then either boiled for some minutes with magnesia or lime, which abstracts the acid of the vegetable salt, and its alkaline base thus set free, being insoluble or only sparingly soluble in water, may be readily separated from the solution by filtration ; or the alkali is separated from its acid by the addition of

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* Sertuerner, a German apothecary, published an account of *morphia* in 1803. No particular notice, however, seems to have been taken of the subject until he published a second essay in 1816 ; but since that period the researches of the French and other continental analysts, have enriched the field of chemical science by increasing the list of this interesting class of compounds.

ammonia or potash. To purify it from any other substances, such as colouring matter, resin, &c., it is mixed with animal charcoal, and dissolved in boiling alcohol, and the solution being filtered whilst hot, the alkali is deposited as it cools: by evaporation, (or distillation, which is preferable, as it prevents a waste of alcohol) the deposition is of course facilitated. This purifying part of the operation is to be repeated until the alkali is obtained colourless. Another method of separating the alkali from its impurities, is to add to the contents of the filter some acid, as for instance, the muriatic, sulphuric, or acetic, which unites with the alkali, and the solution is then to be boiled with animal charcoal, and filtered; after which the alkali is to be separated from the acid, with which it has been combined, by adding a stronger salifiable base, such as ammonia, &c.

The names of the vegetable alkalies, in conformation with the modern nomenclature, are made to terminate in *a*; while those of the other newly discovered vegetable principles, which are neither acid nor alkaline, are for the most part made to end in *in*.

Althea. A substance was obtained by M. Bacon from the root of the *Althæa officinalis*, (marsh-mallow,) which was at first looked upon as a distinct principle, but it is now proved to be identical with *asparagin*, a compound hereafter described.

Brucia was obtained by Pelletier and Caventou from the *Brucea antidysenterica*, and it is also procured, but not so plentifully, from the *Strychnos nux vomica*, and the *Strychnos ignatia*. It resembles strychnia in bitterness, and in being poisonous, but it is less powerfully so than that alkali. It is much more soluble in water than *strychnia*, and is also soluble in hot and cold alcohol. Its being soluble in dilute alcohol, by means of heat, renders it easy of separation from strychnia. When its solution is evaporated, it is deposited in the form of crystals. See *Strychnia*.

CINCHONIA and QUINA. These alkalies, sometimes called *cinchonin* and *quinine*, exist in the cinchona barks in combination with *kinic acid*,* and the febrifuge properties of these barks are dependent upon them. So long since as the year 1803, Dr. Duncan, jun. supposed the virtues of cinchona to depend on a vegetable principle to which he gave the name of *cinchonin*, and Dr. Gomez, of Lisbon, afterwards obtained this principle in a separate state, the alkalinity of which was demonstrated in 1820 by MM. Pelletier and Caventou, who succeeded in the discovery of *quina*.

Cinchonia is obtained by boiling *pale bark* in very dilute sulphuric acid; the decoction being poured off, more water and acid are to be added to the dregs, and the boiling renewed; this process is to be repeated several times: the decoctions contain sulphate of cinchonia in solution, and are to be mixed together and evaporated. Lime is then to be added, which combines with the sulphuric acid forming sulphate of lime, which precipitates along with the cinchonia. The precipitate is then to be pressed, dried, and digested in alcohol, which dissolves the cinchonia but not the sulphate of lime. The alcoholic solution being distilled, the alcohol passes over, and leaves the cinchonia in the retort, and very little loss of spirit is sustained.

Cinchonia is a white, crystalline substance, very sparingly soluble in water, but soluble in alcohol and æther. Its composition is variously stated: according to Brande it consists of carbon, azote, and hydrogen; but MM. Pelletier and Dumas enumerate carbon, azote, hydrogen, and oxygen as its components.

Quina may be procured from *yellow bark* by a process similar to that just described for obtaining cinchonia from pale bark.

Quina does not crystallize. When dried, it is a white porous substance, nearly insoluble in water. It is composed of carbon, azote, hydrogen, and oxygen.

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* See pages 23 and 24.

Kinic acid, which exists in combination with cinchonia, quina, and lime, may be obtained as follows:—macerate cinchona in cold water; concentrate the infusion by evaporation, and set it aside in an open vessel. Kinate of lime (a salt which is tasteless, and insoluble in alcohol, but soluble in cold water) will be deposited in plates. Dissolve the kinate of lime in water, and add oxalic acid to the solution; oxalate of lime will be precipitated, and the kinic acid will be held in solution, and by evaporation it may be obtained in crystals of a brownish colour, having an acid and bitterish taste.

Sulphate of Cinchonia is obtained in colourless crystals which are soluble in water, and possessed of the peculiar flavour of the bark. Its crystals are said to consist of

Sulphuric acid............	11
Cinchonia................	84
Water....................	5
	100

This salt is procured by a process similar to that for obtaining sulphate of quina, hereafter described; but it is very seldom employed medicinally, on account of the expense of preparing it.

Sulphate of Quina is the salt which is now usually substituted for bark in substance. The following most approved formula for preparing this salt is extracted from Paris's Pharmacologia:—Boil for half an hour two pounds of the appropriate bark in powder, in sixteen pints of distilled water, acidulated with two fluid-ounces of sulphuric acid; strain the decoction through a linen cloth, and submit the residue to a second ebullition in a similar quantity of acidulated water; mix the decoctions, and add, by small portions at a time, powdered lime, constantly stirring it to facilitate its action on the acid decoction (half a pound is near the quantity requisite). When the decoction has become slightly alkaline it assumes a dark brown colour, and deposits a reddish-brown flocculent precipitate; which is to be separted by passing it through a linen cloth. The precipitate is to be washed with a little cold distilled water and dried. When dry it is to be digested in rectified spirit, with a moderate heat for some hours; the liquid is then to be decanted, and fresh portions of spirit added till it no longer acquires a bitter taste. Unite the spirituous tinctures, and distil in a water-bath till three fourths of the spirit employed has distilled over. After this operation there remains in the vessel a brown, viscid substance, covered by a bitter, very alkaline, and milky fluid. The two products are to be separated and treated as follows:—To the alkaline liquid add a sufficient quantity of sulphuric acid to saturate it; reduce it by evaporation to half the quantity; add a small portion of charcoal, and, after boiling some minutes, filter it whilst hot, and crystals of sulphate of quina will form. The brown mass is to be boiled in a small quantity of water slightly acidulated with sulphuric acid, which will convert a large portion of it into sulphate of quina. The crystals are to be dried by bibulous paper. Two pounds of bark will, it is said, yield five or six drams of the sulphate; of which eight grains are considered equivalent to an ounce of bark.

Sulphate of quina has been prepared in this country by several manufacturing chemists. The superior price of bark, however, from the duty fixed upon it in this country, as well as that upon alcohol, must prevent us from entering into competition with the French in its manufacture, and it has accordingly been found more economical to import, than to prepare it.

Prop.—Sulphate of quina may be given in all cases in which bark has been found efficacious. It imparts tone to the system without the inconvenience of loading the stomach with woody fibre as when bark is administered in substance. Besides some stomachs reject bark, but will retain the sulphate of quina.—Dose, gr. j. to gr. v. It may be given in form of pill, with conserve of roses, or dissolved in water by means of a little dilute sulphuric acid, the proportion of which may be ♏j. or ♏ij. to each grain of the sulphate.

CORYDALIN is contained in the root of the *Fumaria cava* and *Corydalis tuberosa* of Decandolle, but not in that of the common fumitory (*Fumaria officinalis*). It is combined in the plant with malic acid, and is obtained in crystals, which, when pure, are colourless. It has distinct alkaline properties, and forms neutral salts with acids.

CYNOPIA. The alkali to which this name is given, has been found to exist in the *Æthusa Cynapium* or lesser hemlock. It is obtained in crystals.

DELPHIA is an alkali contained in the seeds of the *Delphinium Staphysagria*. When separated in a pure state, it is in form of a white crystalline powder.

EMETIA is the active principle of ipecacuanha. It was first discovered by M. Pelletier, who called it *emetine*. It is a white pulverulent substance, of a bitterish and unpleasant taste, sparingly soluble in cold, but readily soluble in hot water and in alcohol. It has an alkaline reaction, and forms neutral salts with acids. The root of ipecacuanha contains about 16 per cent. of this alkali. PROP.—Emetic.—DOSE. gr. j.—It is, however, as far as we can understand, seldom employed in this country.

MORPHIA. Amongst a variety of other substances, opium contains *morphia*, *meconic acid*, and *narcotine*. The morphia is combined in the plant with the meconic acid forming meconate of morphia. Narcotine is not possessed of alkaline properties. The best mode of procuring morphia is perhaps that recommended by Robiquet. He directs the concentrated infusion of a pound of opium to be boiled for a quarter of an hour with about 150 grains of pure magnesia: a greyish crystalline precipitate is thrown down consisting of meconate of magnesia, morphia, narcotine, excess of magnesia, and colouring matter. This precipitate is to be washed on the filter after the supernatant liquor has filtered away. It is then to be digested in dilute alcohol at a temperature of 120° or 130° F. by which means the narcotine and the greater part of the colouring matter is separated. The remaining powder being then acted upon by concentrated boiling alcohol, the morphia is dissolved, and becomes deposited in colourless crystals as the solution cools. Morphia is nearly quite insoluble in cold, and only slightly soluble in hot water. It is soluble in strong alcohol, and its solution in that liquid is facilitated by heat. It consists of carbon, oxygen, hydrogen, and azote, in proportions, which have been differently stated by different chemists. It has an alkaline reaction, and with acids forms neutral salts.

PROP.—Morphia is the principle to which opium owes its narcotic properties, without its unpleasant stimulating effects. It is best administered under the form of *acetate of morphia,** that salt being readily soluble in water. In its pure state, owing to its insolubility, morphia is nearly inert. There is much difference of opinion amongst medical men in this country, respecting the propriety of employing morphia as a medicine instead of opium.—DOSE of the acetate of morphia gr. ¼.

Meconic Acid.† Robiquet procured this acid from the magnesian precipitate, already described under the directions for obtaining morphia, by dissolving the meconate of magnesia in dilute sulphuric acid after the morphia has been separated from it. Solution of muriate of baryta being then added, a precipitate of sulphate and meconate of baryta is obtained, which being decomposed by dilute sulphuric acid, the meconic acid is set free and held in solution, and is obtained in crystals by evaporation. It may be deprived of the colouring matter by sublimation. This acid may also be procured by other processes.

Meconic acid reddens litmus paper, is readily soluble in water and in alcohol, and has a sour taste, which is

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* It is supposed that Battley's sedative liquor owes its properties to this salt.

† From Μηκων, poppy.

succeeded by a bitter one. Its composition has not been determined. It is said not to produce any effects whatever on the animal economy.

Narcotine. This is a vegetable principle, neither acid nor alkaline, and is described in this section instead of Section 3, for the sake of convenience. It has been described as long since as 1803, by Derosne, and was formerly known under the name of *salt of Derosne.* It may be procured by evaporating an aqueous infusion of opium until it acquires the consistence of an extract, which is to be digested in sulphuric ether: the narcotine is held in solution, and is obtained in crystals by evaporation. As ether does not dissolve the meconate of morphia, extract of opium may thus be readily separated from narcotine, and morphia may also be freed from narcotine in the same way.

Narcotine appears to consist of carbon, oxygen, hydrogen, and azote. It is only sparingly soluble in hot water, and is quite insoluble in cold; but is, however, capable of dissolving in water with the assistance of an acid. It is soluble in oil, ether, alcohol, and also in dilute alcohol by means of heat.

Opium owes the unpleasant effects which it produces on the system to the presence of narcotine. Some constitutions will not admit opium or its tincture to be taken internally without experiencing serious inconvenience. In such habits in particular, acetate of morphia, or extract of opium deprived of narcotine, may be administered with advantage.

Parillina is contained in Sarsaparilla. See page 61.

Picrotoxia, called *picrotoxine* by M. Boullay, who discovered it in 1819, is the poisonous and bitter principle of the *Cocculus indicus*. M. Casaseca disputes its alkaline properties, although it is capable of forming compounds with acids. The *menispermic acid* with which it is united in the above plant, is said to consist of a mixture of sulphuric and malic acids.

Sanguinaria is the name given to the alkali obtained from the *Sanguinaria Canadensis*, called *Blood-root* in

America, from its juice being of a red colour. This alkali, when first procured, is of a pearly-white lustre, but it becomes yellow by exposure to air. It forms salts with acids which are red.

SOLANIA. This alkali, which was first procured by Desfosses, exists in the *Solanum dulcamara*, and in other species of *solanum*. It is contained in the plant in combination with malic acid, and may be obtained by expressing the ripe berries, filtering the juice, and adding ammonia. As thus procured it is of a grey colour, but by washing, drying, dissolving it in alcohol, and slowly evaporating the solution, it is eventually obtained in form of a white powder having a pearly lustre. It is insoluble in cold, and very sparingly soluble in hot water, but readily dissolves in alcohol. It forms neutral salts with acids, and has an alkaline reaction.

STRYCHNIA was first obtained in 1818, by Pelletier and Caventou, from the fruit of the *Strychnos ignatia* and *Strychnos nux vomica*, in which it exists combined with igasuric acid; and they have since then procured it from the *Upas*. The mode of obtaining this alkali, as adopted by M. Corriol, is considered the most economical. Nux vomica is to be acted upon repeatedly with cold water; the several effusions are then to be mixed together, and the whole evaporated to the consistence of syrup. Alcohol is then to be added, which precipitates the gum that is present. The alcoholic solution being next evaporated by means of a water bath, an extract is afforded, which consists principally of igasurate of strychnia. This extract is to be dissolved in cold water, which deprives it of some fatty matter that is present in it; and the solution is then to be heated, and the strychnia precipitated by adding lime water a little in excess. The precipitate is next to be dissolved in boiling alcohol, and by distilling over the spirit, the strychnia is obtained in combination with a little brucia and colouring matter, which are to be removed by macerating in dilute alcohol.

Strychnia is nearly insoluble in water, but readily soluble in boiling alcohol. It has an alkaline reaction, and forms neutral salts with acids, most of which are soluble in water. It has an intensely bitter taste.

Strychnia is the poisonous principle of the substances from which it is obtained. In its pure state, it is one of the most deadly of poisons. It has notwithstanding found its way into the hands of the medical practitioner.

The *Nux vomica* is included in the Materia Medica of the Dublin College :—*Strychnos nux vomica*. Pentandria Monogynia. This tree is a native of the Indian Archipelago, the coast of Coromandel, and some parts of China. The fruit is of the size of an orange, and is surrounded with a yellow, crustaceous bark, which incloses a fleshy pulp, in which are imbedded several of the well-known velvety seeds, (*vulg.* nuts).—PROP.—Stimulant, tonic, narcotic. Nux vomica and pure strychnia have been successfully employed in paralysis of the extremities arising from rheumatism, or the action of carbonate of lead. The Dublin Pharmacopœia gives a formula for preparing an extract from the rasped and powdered nut with proof spirit, which is considered an eligible form for exhibiting strychnia.—DOSE, of the extract, gr. ss. to gr. ij.; of pure strychnia, gr. $\frac{1}{16}$ two or three times a-day, in form of pill or tincture.

VERATRIA. This alkali is found in combination with gallic acid in the seeds of the *Veratrum sabadilla*, in the root of the *Veratrum album*, and in the root and seeds of the *Colchicum autumnale*. It was first discovered by Pelletier and Caventou in 1819, and may be prepared by processes similar to those already described for obtaining the other vegetable alkalies.

Veratria is a white, pulverulent substance. It has an acrid taste; and when applied in only a very minute quantity to the nose, it produces violent sneezing. It is slightly soluble in hot and cold water, dissolves very readily in alcohol, has an alkaline reaction, and forms neutral salts with acids.

PROP.—Veratria is the active principle of the *Veratrum album* and *Colchicum autumnale*, plants which are placed in the list of the Materia Medica of the London

College. When taken internally in only very small doses, it excites a great degree of irritation in the mucous coat of the stomach and intestines ; and a very few grains have proved fatal to animals to which it has been administered.

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§ 3. NEWLY DISCOVERED VEGETABLE PRINCIPLES, WHICH ARE NEITHER ACID NOR ALKALINE.

ASPARAGIN* is the name given to a principle which exists in the juice of asparagus, from which it may be procured in a crystalline form by evaporation. It is also present in the root of the marshmallow and liquorice. It was originally discovered by Vauquelin and Robiquet. Asparagin is capable of being resolved into ammonia and a new acid called the *aspartic*.

BASSORIN is the principle first noticed in gum *Bassora* by Vauquelin. It is also said to exist with common gum in gum tragacanth, and in cherry-tree gum ; and salep is almost entirely composed of it. With cold water it forms a bulky jelly, insoluble in water, alcohol and ether. By long boiling in water it undergoes a change, being converted into a soluble substance resem bling gum-arabic.

CAFFEIN is a white crystalline principle, first obtained by Robiquet from coffee. Its crystals hang together resembling silky filaments, similar to amianthus. Although this substance contains more azote than most kinds of animal matter, yet it is not capable of undergoing the putrefactive fermentation.

CATHARTIN. The active principle resident in senna is known under this name.

CHLOROPHYLE is the name given to the green colouring matter of the leaves of plants. It has been separated in a pure state. The change which is apparent in the colour of leaves at the close of the year, is owing to

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* The names of those vegetable principles which are neither acid nor alkaline, are for the most part made to end in *in*.

the formation of an acid in their juices. The green colour of leaves, thus changed, may be restored by an alkali.

COLOCYNTIN is a brittle, bitter, resinous substance, of a golden-yellow colour, and was first obtained by Vauquelin from *Colocynth*; it is the active principle of that plant.

COUMARIN* is the odoriferous principle of the *Tonka-bean*. It is obtained in form of crystals, and its properties are somewhat allied to those of the essential oils.

FUNGIN. M. Braconnot has given this name to the principle which is obtained from the fleshy substance of the mushroom. Fungin is extremely nutritious, and resembles animal substances in composition, and in yielding azote when digested in dilute nitric acid.

INULIN is spontaneously deposited from a decoction of the root of the *Inula helenium*. It is in form of a white powder resembling starch, but totally distinct from that substance in its properties.

LUPULIN. This term has been applied to the active principle of *hops*. It has not yet been obtained in a perfectly pure state.

OLIVILE is a peculiar principle, which has been obtained from the gum of the olive tree.

PIPERIN is a white, crystalline principle obtained from pepper. It is devoid of taste and smell. The pungent and stimulating property of pepper resides in a fixed oil.

PLUMBAGIN is a yellow, crystallizable principle obtained from the root of the *Plumbago Europæa*.

RHEIN and RHUBARBARIN. These two principles exist in the root of rhubarb, *Rheum palmatum*. The active properties of rhubarb depend upon the *rhubarbarin*.

SALICINE. This name is given to the principle very lately found to exist in the willow bark. It is tonic, and

* From *Coumarouna odorata*, the name given by Stublet to the plant which yields the Tonka-bean.

may be given in those cases in which sulphate of quina is found of service.

Sarcocoll is the concrete juice of an African plant called *Penœa sarcocolla*. It is brought to this country in the state of small grains, which are of a yellowish colour. It is soluble in the mouth, has a sweetish taste, and forms a mucilage with water; but is distinguished from gum by being soluble in alcohol, and by a precipitate being thrown down when tannin is added to a solution of it in water.

Suberin is the cellular tissue of common cork,* deprived of resinous, oily, astringent, and other soluble matters contained in it, by means of water and alcohol. This substance yields the suberic acid when acted upon by nitric acid, which distinguishes it from the other vegetable principles.

Ulmin. This substance, first noticed by Klaproth, is a spontaneous exudation of the elm, oak, chesnut, and other trees. Berzelius states that it is contained in the bark of most trees. Boullay considers it as an acid, and has given it the name of *ulmic acid.* It is a very dark-coloured substance, having neither taste nor smell.

Besides the newly discovered vegetable principles, mentioned in the preceding sections, some others, on which the active properties of certain plants are supposed to depend, have been noticed by different chemists; but as their identity has not been satisfactorily ascertained, it is not necessary to mention them in this place.

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§ 4. THE FOLLOWING LIST COMPRIZES SOME OF THE MORE COMMON PROXIMATE VEGETABLE PRINCIPLES, WHICH ARE NEITHER ACID NOR ALKALINE.

Amber. See *Succinum*, page 69.

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* Cork is the outer bark of the *Quercus suber* or cork-oak.

Camphor. See Materia Medica. Camphor is composed of 10 atoms carbon, 1 atom oxygen, and 9 atoms hydrogen, according to Dr. Ure. It is extremely volatile, and should be kept in close vessels. It may be easily reduced to powder by triturating it with a few drops of alcohol. Camphor is allied to the essential oils.

Caoutchouc. This substance, commonly called *Indian rubber* or *elastic gum*, is the concrete juice of the *Hœvea caoutchouc* and *Iatropa elastica* of South America, and of the *Ficus Indica* and *Artocarpus integrifolia* of the East Indies. Caoutchouc appears to consist of carbon, oxygen, hydrogen, and azote. It is employed for forming a variety of useful articles. It is insoluble in water, and alcohol; but is dissolved by the essential oils. The purified naphtha of coal-tar, on account of its cheapness, is an useful solvent for it.

Colouring matter. The colouring matter of vegetables is generally combined in the plant with other principles. To enter largely into a description of the different kinds of colouring matter would lead to the subject of *dyeing*, which is irrelevant in this place. The colouring principle of the *Lichen rocella*, as applicable to the purposes of Chemistry, is explained at page 78, and that of the *Curcuma longa*, at page 90. The colouring principle of saffron has received the name of *polychroite*, from its being capable of assuming a great variety of colours when placed under different circumstances; and the colouring principle of logwood, which in a separate state is capable of being crystallized, is called *hæmatin ;* while that of madder is called *alizarine*, from the commercial name of madder in the Levant.

Gum, in different states of purity, is afforded by several plants. The purest kind of gum is gum-arabic : See *Acaciæ Gummi* in the Materia Medica. When gum is acted upon by nitric acid it yields the saccholactic acid, along with the oxalic and malic acids. Gum consists of carbon, oxygen, and hydrogen. Vegetable jelly, such as currant jelly, is probably gum or mucilage in combination with some vegetable acid.

Lignin or *woody fibre*, is the fibrous part of vegetables. It seems to act the same part as phosphate of lime in bones, being apparently designed for the strength and support of the plant. It constitutes the principle part of all vegetables. To obtain it, digest any kind of saw-dust first in alcohol, then in water, and lastly in dilute muriatic acid, by which means all vegetable and earthy parts are removed, and pure lignin remains. It has neither taste nor smell, and is not capable of being dissolved by water, alcohol, or dilute acids. It is composed of carbon, oxygen and hydrogen, and when acted upon by strong nitric acid, the oxalic, malic, and acetic acids are generated. When submitted to destructive distillation, impure acetic acid *(pyroligneous acid)** is afforded, and charcoal in a very pure state remains in the retort. During the distillation a spirituous compound is formed, known under the name of *pyroxylic spirit.* This spirit is distinguished from alcohol by not forming æther when treated with sulphuric acid. It burns very readily, and as it does not deposit carbon during combustion, it may be employed as a substitute for spirit of wine to burn in spirit lamps, being much cheaper. It is composed of carbon, oxygen, and hydrogen.

Oils. Two kinds of oils are obtained from vegetables, viz : *Fixed* or *expressed oils*, and *volatile*, *essential*, or *distilled oils*. See *Olea expressa,* page 204, and *Olea destillata*, page 207.

Resins, Gum Resins, and Balsams.—*Resins* are the inspissated juices of plants. They are composed of carbon, oxygen, and hydrogen. When pure they have neither taste nor smell They are non-conductors of electricity, and are rendered negatively electric by rubbing. They are insoluble in water, but are soluble in alcohol, æther, and the essential oils, and in solutions of pure potash and soda. They are precipitated from

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* This acid is described at page 8.

their solution in alcohol and æther by adding water, and from their alkaline solutions by adding an acid. A description of some of the different resins has already been given in the Materia Medica.

Gum-resins are composed of resin, essential oil, gum, and extractive matter. When tinctures are made with gum-resins, proof spirit is employed as the solvent, the alcohol of which dissolves the resin and essential oil, and the water dissolves the gum and extractive matter. Several of the gum-resins, such as *assafœtida*, *ammoniacum*, *galbanum*, *gamboge*, *myrrh*, *guaiacum*, *scammony*, *&c.* have already been described in the Materia Medica.

Balsams are those substances which consist naturally of resin, and benzoic acid. See *Styracis balsamum*, *benzoinum*, *balsamum Peruvianum*, and *balsamum Tolutanum* in the Materia Medica.

STARCH or FECULA, is contained very plentifully in most kinds of grain, in the kernels of leguminous plants, and in some roots, such as the potatoe. The *Indian arrow-root*, which is prepared from the root of the *Maranta arundinacea*,—*sago* from the pith of an East Indian palm-tree, the *Cycas circinalis*,—*tapioca* and *cassava* from the root of the *Iatropha Manihot*, are only modifications of starch, the difference between each arising from the mode of preparation. The manner of obtaining starch on the large scale from wheat, has been explained at page 13. Starch is composed of carbon, oxygen, and hydrogen.

SUGAR, MOLASSES, and HONEY. *Sugar* is the produce of a great number of plants, some of which yield it in great abundance. The chief part of the sugar consumed in Europe, is now imported from the West Indies. The mode of obtaining sugar from the sugar-cane is described at page 59. Sugar crystallizes, forming *sugar-candy*, if a syrup made with it be allowed to evaporate spontaneously in a warm room: the crystallization may be facilitated by adding spirit of wine.—*Molasses* differs from sugar in containing acid, saline, and other matters.—*Honey*, (See *Mel*, page 43,) consists of sugar, along with mucilaginous, colouring, and other matters.

TANNIN is the principle to which the astringency of the different parts of plants is chiefly to be ascribed. It is frequently contained in the plant along with gallic acid. It exists plentifully in *gall-nuts*, in the bark of most trees, in the leaves of some, and in the inspissated juices of others. Different modes of obtaining tannin in a pure state are laid down in chemical works. Tannin has an astringent taste, but no smell, and is colourless. It is soluble in water, and the solution turns litmus paper red. When solution of tannin is added to a solution of gelatine, a yellowish precipitate is thrown down, which has been called *tanno-gelatine*. This compound is insoluble in water, is rendered tough by drying, and has a strong resistance to putrefaction. It constitutes the basis of leather. Skins are converted into leather by macerating them in a strong infusion of bark. Tannin is composed of carbon, oxygen, and hydrogen. Vegetable infusions or decoctions containing tannin, are ineligible vehicles for the salts of iron, as a black precipitate is produced, which, if gallic acid be also present, is *tanno-gallate* of iron.

VEGETABLE ALBUMEN exists in different kinds of grain, in emulsive seeds and kernels, and in the sap of several plants. It resembles animal albumen in coagulating by heat, and in being acted upon in a similar way by means of corrosive sublimate and ferrocyanate of potash. It dissolves in cold water, but is coagulated by a boiling temperature ; and, like animal albumen, is not capable of again being rendered soluble in that liquid. It is insoluble in alcohol. Azote is one of its elements.

GLUTEN is the nutritious principle of the different kinds of grain, but it is most abundant in wheat, hence bread made of wheat-flour is a more substantial article of food than that made with the flour of any other grain. To obtain pure gluten, wash a lump of dough under a stream of water, kneading it all the time with the hand; the starch and soluble parts of the dough will be washed away, and a grey elastic substance will remain, which is to be acted upon with boiling alcohol; water being next added, and the spirit distilled off, the gluten remains. It is of a pale yellow colour when thus procured, is very elastic, and adheres to the fingers if they are free from moisture. It has no taste, but emits a peculiar odour; and is insoluble in water, but soluble in hot alcohol. Placed in a warm, moist situation, it soon ferments, and eventually putrefies, giving off, at first, carbonic acid and hydrogen gases; afterwards the acetic and phosphoric acids and ammonia are produced, and two new compounds, called by Proust *caseic acid* and *caseous oxide*, which are identical with the principles formed during the fermentation of the curd of milk. Gluten consequently contains azote and resembles animal substances.

YEAST, a substance generated whenever vinous fermentation takes place in vegetable infusions or juices, is supposed to be analogous to gluten. See *Cerevisiæ Fermentum*, page 23.

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§ 5. BITUMINOUS SUBSTANCES.

Bituminous substances are those of vegetable origin, obtained out of the earth. *Petroleum*, *naphtha*, and *mineral tar*, are fluid, and flow out of the earth in some parts of the world, as explained at page 49. *Mineral pitch* or *Maltha*, (and a variety of it called *elastic bitumen* or *mineral caoutchouc*, found in Derbyshire,) *asphaltum*, and *retinasphaltum* are afforded in a solid state. These several substances probably differ from each other merely in the gradations of decomposition which the original vegetable matter has undergone.

Besides the above, may be enumerated the several varieties of coal, a minute description of which is not necessary in a work of this kind. *Pitch coal* or *jet*, used for forming different sorts of trinkets, is amongst the class alluded to. Coal in general consists of carbon, hydrogen, azote, and oxygen, but in some kinds, according to Dr. Thomson, no oxygen appears to be present.

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§ 6. VEGETABLE FERMENTATION.

The term *fermentation* is applied to those changes to which vegetable matter is liable after the vital principle of plants is extinct. The same kind of decomposition or fermentation is not common to all vegetable products, but four distinct kinds are observable, viz: the *saccharine*, *vinous*, *acetous*, and *putrefactive*. All vegetable compounds, however, are not equally prone to decomposition, but several of them may be preserved a considerable time without their properties being altered.

1st. SACCHARINE FERMENTATION. Starch consists of carbon, oxygen, and hydrogen, and when subjected to moisture, saccharine fermentation takes place; or, in other words, the elements in question, by arranging themselves in different proportions, give rise to the formation of sugar: the quantity of sugar produced is equal to about half the weight of the starch employed. This kind of fermentation takes place during the germination of seeds in the earth, and it is applied to domestic purposes in the process of making malt. *Malting* consists in submitting barley to the action of moisture, warmth, and air. It is first steeped in water for about two days, which causes it to swell and become soft, and then it is laid in heaps of about 30 inches in depth for twenty-six or thirty hours. In this state heat is generated and germination begins to evince itself. To allow the germination to take place equally, it is next spread out in strata a few inches in depth on airy floors. Here it is allowed to remain for twelve or fourteen days, until it has germinated to the extent required, being occasionally turned so as to allow each grain to be properly exposed to the air, and to give to the whole an uniform temperature. The process of germination is then stopped by placing it in a kiln, the temperature of which is gradually increased from 100°

to 160° or higher, so as to dry the barley and prevent its future germination.

It has been explained by Saussure that during the process of germination, oxygen is absorbed, and carbonic acid given out. In consequence of carbon being thus abstracted, barley after malting weighs lighter than before. Some water is also supposed to be formed by the union of oxygen and hydrogen, which is dissipated by drying, along with the water added during the process.

Starch is the only known substance which is capable of undergoing the saccharine fermentation.

2d. VINOUS FERMENTATION consists in the conversion of sugar into alcohol, by a new arrangement of the principles already noticed under starch, viz: carbon, oxygen, and hydrogen. Thus, if malt be macerated in hot water, and yeast be added to the infusion after it has drained off, as in making ale, vinous fermentation takes place, and the sugar of the malt gives rise to alcohol, which constitutes the stimulating and intoxicating principle of ale. We mention this as the most familiar instance of vinous fermentation in this country, but the making of wines and other fermented liquors, may also be adduced as examples of this kind of fermentation.

A solution of pure sugar does not undergo the vinous fermentation without being mixed with yeast, or some ferment of this sort; but the saccharine juices of different vegetables do not require it to be added that the fermentation may take place, in consequence of their containing some principle capable of producing fermentation. Yet it is to be observed that when yeast has been added for the purpose of exciting fermentation, the presence of atmospheric air is not necessary to the process; but fermentation does not take place in the juices alluded to unless they are exposed to the air, so that we may infer these juices contain some principle capable of forming yeast, or something analogous to it, by the absorption of oxygen.

The changes which take place during the vinous fermentation give rise to alcohol and carbonic acid: the latter is given off in the state of *gas*. The amount of alcohol and carbonic acid produced, is found to be equal to that of the sugar which disappears during the process.

3d. ACETOUS FERMENTATION. If ale, wine, or any other liquor, which has undergone the vinous fermentation, be exposed to the air in a warm situation, as in the process of making vinegar, a change is soon observable in it, and after a time the alcohol which it contained disappears, and acetic acid is produced. The same change takes place if a mixture of water, alcohol, and yeast be similarly exposed. The formation of acetic acid is owing to a new arrangement of the carbon, oxygen, and hydrogen, constituting alcohol; but the precise nature of the change which takes place, is not understood. Oxygen, however, is absorbed from the atmosphere, and carbonic acid *gas* is evolved.

4th. PUTREFACTIVE FERMENTATION is that which vegetable substances undergo while putrefying or rotting. Moisture and a certain degree of temperature, as well as exposure to atmospheric air, are necessary to the process, at least, if atmospheric air is not altogether requisite, it promotes the decomposition in question. By a new arrangement of the vegetable elements, water, some acetic acid, &c. are produced; while several gases, such as light carburetted hydrogen, carbonic acid (and ammonia, when azote is present), are evolved; and some solid part remains after the process has ceased, which consists principally of carbon.

OLEA EXPRESSA.

EXPRESSED OILS.

Fixed, or, as called by the College, *expressed oils*, are nearly all fluid at the ordinary temperature of the atmosphere. When pure, they are almost entirely devoid of taste and smell. They are lighter than water. They boil at about 600° F. but are partially decomposed, giving off a vapour which is inflammable. They are also decomposed by heat in close vessels. By exposure to the air at common temperatures they become changed. Although not soluble in water, they may be made to unite with that fluid by means of mucilage, sugar, or yolk of egg, forming *emulsions*. With the fixed alkalies they combine and form soaps, the process of making which is described at page 60; but they are decomposed by acids. They unite in all proportions with each other, with the volatile oils, and with resinous substances. The permanent stain which they leave on paper distinguishes them from the volatile oils. They are nearly insoluble in alcohol and ether, with only one or two exceptions.

Fixed oils are composed of oxygen, hydrogen, and carbon. Like fats, they consist of two substances, namely stearine,* which is solid at common temperatures, and eläine,† which is fluid under the same circumstances. The latter is most predominant in oils; the former in suet, butter, &c. These substances are readily separated from each other as follows: expose fixed oil to a low temperature, and when congelation has taken place, press it between folds of blotting paper, which removes the stearine; then by pressing the paper under water an oily fluid is obtained, which is pure eläine.

Fixed oils are obtained from the seeds of plants either by expression or decoction in water; but olive oil is afforded from the pulpy part of the fruit which surrounds the stone, see page 46. In expressing oils, the process is assisted by heating the plates of the press, or previously roasting the seeds; but oil obtained in this manner sooner becomes rancid, the cold drawn oils are consequently preferable. When decoction is resorted to for obtaining the oil, the seeds are first bruised, then

* From στεαρ, suet. † From ελαιον, oil.

boiled in water, and the oil rising to the top of the water, is skimmed off. *Wax* is allied to the fixed oils.

OLEUM AMYGDALARUM.

OILS OF ALMONDS.

Macera vel dulces vel amaras Amygdalas
Macerate either sweet or bitter Almonds

per horas duodecim in aquâ frigidâ, et contunde;
for twelve hours in cold water, and bruise (them;)

deinde, nullo calore adhibito, exprime Oleum.
then, no heat being applied, express the Oil.

PROP.—Demulcent and emollient. Formed into an emulsion with mucilage or yolk of egg, it may be exhibited in coughs, &c.—DOSE, f℥ss. to f℥j.

OLEUM LINI.

LINSEED OIL.

Contunde Semina Lini usitatissimi; deinde,
Bruise the Seeds of common Flax; then,

nullo calore adhibito, exprime Oleum.
no heat being applied, express the Oil.

PROP.—Demulcent, emollient, and slightly aperient. Seldom exhibited by the mouth, in consequence of its very nauseous taste. It is, however, said to have been found efficacious in ileus when other purgatives have been of no avail. It may be exhibited in form of glyster in flatulent colic, and in abrasions of the lower intestines. When united with lime-water, an earthy soap is formed, which is of service as an external application to burns and scalds.—The DOSE of linseed oil is from f℥ss. to f℥j. In form of glyster f℥v. or f℥vj. may be administered.

OLEUM RICINI.

CASTOR OIL.

Contunde Semina Ricini, pelliculis
Bruise the Seeds of the Ricinus, the husks

demptis; deinde, nullo calore adhibito,
being taken away; then, no heat being applied,

exprime Oleum.
express the Oil.

For Prop., &c. see Materia Medica, page. 56.

OLEA DESTILLATA.

DISTILLED OILS.

Volatile, *essential*, or as called improperly by the College, *distilled oils*, are afforded by almost every part of the plant, except the cotyledons of the seeds, where the fixed oils generally reside. These oils are in general only to be separated from the part of the plant in which they exist by distillation; but some being contained in distinct vesicles, may be obtained by expression: the oils of the lemon and orange are contained in vesicles in the rind of the fruit, and are yielded in this way. When distillation is resorted to, the oil comes over with the water in the still, from which it is readily separated; those oils which are lighter than water swim on the surface, while those which are heavier sink to the bottom. As the water retains as much of the oil as it can dissolve, it may be repeatedly employed for the distillation of fresh materials, by which means each succeeding distillation will afford a greater quantity of oil.

The odour of plants is in general owing to a volatile oil. Volatile oils are distinguished by their odour and hot taste. They are so perfectly volatile as not to leave the slightest stain upon the most delicate paper, if quite pure, which serves to detect any adulteration with the fixed oils; for if the least quantity of fixed oil be present, a greasy stain will remain. They are inflammable, and yield carbonic acid and water during combustion. They should be kept in close stopped bottles, not merely on account of their volatility, but also on account of their disposition to absorb oxygen from the air, and undergo decomposition. They are only slightly soluble in water, but may be made to unite with it in a greater proportion by means of sugar. They are soluble in alcohol and æther, and unite with the fixed oils. They are composed of carbon, oxygen, and hydrogen. Most of them are lighter than water; but the oils of cassia, cinnamon, cloves, and pimenta, are heavier than that fluid.

Oleum Anisi.	*Oil of Aniseed.*
—— Anthemidis.	—— *Chamomile.*
—— Carui.	—— *Carraway.*
—— Juniperi.	—— *Juniper.*
—— Lavandulæ.	—— *Lavender.*
—— Menthæ Piperitæ.	—— *Peppermint.*
—— Menthæ Viridis.	—— *Spearmint.*
—— Origani.	—— *Marjoram.*
—— Pimentæ.	—— *Pimenta.*
—— Pulegii.	—— *Pennyroyal.*
—— Rosmarini.	—— *Rosemary.*

Semina	Anisi	et	Carui,	Flores
The Seeds	*of Anise*	*and*	*Carraway,*	*the Flowers*

Anthemidis	et	Lavandulæ,	Baccæ	Juniperi
of Chamomile	*and*	*Lavender,*	*the Berries*	*of Juniper*

et Pimentæ, Cacumina Rosmarini,
and Pimenta, (and) the Tops of Rosemary,

sunt adhibenda; et herbæ recentes reliquorum.
are to be employed; and the fresh herbs of the rest.

Immitte quodvis horum in alembicum, et
Put any of these into an alembic, and

adjice Aquæ quantum contegat id, tum
add of Water as much as may cover it, then

destillet Oleum in vas frigidarium amplum.
let the Oil distil into a large cold vessel.

Aqua, quæ prodit (inter destillandum)
The water, which comes over (whilst distilling)

cum Oleis Carui, Menthæ piperitæ, et
with the Oils of Carraway, Peppermint, and

viridis, Pimentæ, et Pulegii,
Spearmint, Pimenta, and Pennyroyal,

servetur in usum.
should be preserved for use.

OLEUM SUCCINI.

OIL OF AMBER.

Immitte Succinum in alembicum, ut
Put the Amber into an alembic, that

Liquor acidus, Oleum, et Sal inquinatus
the acid Liquor, the Oil, and the Salt impregnated

oleo, destillent balneo arenæ, calore
with the oil, may distil in a bath of sand, the heat

paulatim aucto. Dein Oleum destillet iterum,
gradually being increased. Then let the Oil distil again,

et tertiò.
and a third time.

The oil is the result of the decomposition which takes place during the operation: it does not exist in the amber.

Prop.—This oil is stimulant and antispasmodic, internally; and rubefacient, externally.—Dose, from ♏v. to ♏xij. united with water *secundum artem*. It is now chiefly confined to external use as a local application in rheumatism, paralysis, &c. United with tincture of opium, and rubbed two or three times a-day upon the chest, it is said to be serviceable in hooping cough. *Roche's embrocation* for the hooping cough is composed of 2 parts olive oil, 1 part oil of amber, and 1 part oil of cloves.

Off. Prep.—*Spiritus Ammoniæ succinatus.*

OLEUM TEREBINTHINÆ RECTIFICATUM.

RECTIFIED OIL OF TURPENTINE.

Recipe	octarium	Olei	Terebinthinæ;
Take	*a pint*	*of the Oil*	*of Turpentine;*

octarios quatuor Aquæ;
four pints *of Water;*

Destillet Oleum.
Let the Oil distil.

Prop.—The rectified oil of turpentine may be used for the same purposes as the oil of turpentine described in the Materia Medica, page 72.

AQUÆ DESTILLATÆ.

DISTILLED WATERS.

As respects the union of volatile oils with water, see the note under *Olea destillata*. The distilled waters are chiefly employed as vehicles for the exhibition of other medicines.

AQUA DESTILLATA.

DISTILLED WATER.

Recipe congios decem Aquæ ;
Take ten gallons of Water ;

Primùm destillent octarii quatuor quibus
First let four pints distil which

abjectis, destillent congii quatuor. Serva
being thrown away, let four gallons distil. Keep

Aquam destillatam in lagenà vitreâ.
the distilled Water in a glass bottle.

Singulis congiis Aquarum quæ sequuntur,
To every gallon of the Waters which follow,

adjice fluiduncias quinque Spiritûs tenuioris, ut
add five fluid-ounces of proof Spirit, that

conserventur integræ.
they may be kept pure.

The impurities of common water are spoken of in another part, see *Index*. It is absolutely necessary that distilled water should be employed for dissolving those substances enumerated under the head of Water in the *Table of Incompatibles* in the *Appendix*. Rain water caught in clean earthen vessels, placed at a distance from houses, trees, &c. in such a manner that the water falling on the outside cannot throw any earthy substances into them by splashing, may be substituted for distilled water, especially after it has been filtered through blotting paper, so as to remove any animalcula it may contain.

AQUA ANETHI.

WATER OF DILL.

Recipe libram contusorum Seminum Anethi;
Take a pound of bruised Seeds of Dill:

Affunde his tantum Aquæ, ut, post des-
Pour to these so much Water, that, after dis-

tillationem, supersit quod sit
tillation, there may remain that which may be

satis ad prohibendum empyreuma. Destillet congius.
sufficient to prevent empyreuma. Let a gallon distil.

Prop.—Frequently employed as a carminative for infants, and as a vehicle for magnesia and rhubarb.

AQUA CARUI.

WATER OF CARRAWAY.

Recipe libram Seminum contusorum Carui;
Take a pound of bruised Seeds of Carraway;

Affunde his tantum Aquæ, ut, post destil-
Pour to these so much Water, that, after distil-

lationem, supersit quod sit satis
lation, there may remain that which may be sufficient

ad prohibendum empyreuma. Destillet congius.
to prevent empyreuma. Let a gallon distil.

Prop. and Use.—The same as the above.

AQUA CINNAMOMI.

WATER OF CINNAMON.

Recipe	libram	Corticis contusi	Cinnamomi;
Take	*a pound*	*of bruised Bark*	*of Cinnamon;*

vel scrupulos quinque,	pondere,	Olei
or five scruples,	*by weight,*	*of the Oil*

Cinnamomi;
of Cinnamon;

Oleo,	vel Cortici	macerato	in Aquâ
To the Oil,	*or to the Bark*	*macerated*	*in the Water*

per	horas quatuor et viginti,	affunde	tantum	Aquæ,
for	*twenty-four hours,*	*pour*	*so much*	*Water,*

ut,	post destillationem,	supersit	quod
that,	*after distillation,*	*there may remain*	*that which*

sit	satis	ad prohibendum	empyreuma.
may be	*sufficient*	*to prevent*	*empyreuma.*

Destillet congius.
Let a gallon distil.

Prop.—Aromatic, and mildly stimulant. Principally employed as a vehicle for nauseous medicines.

AQUA FŒNICULI.

WATER OF FENNEL.

Recipe	libram	Seminum	Fœniculi	contusorum;
Take	*a pound*	*of Seeds*	*of Fennel*	*bruised;*

Affunde	his	tantum	Aquæ,	ut,	post destil-
Pour	*to these*	*so much*	*Water,*	*that,*	*after distil-*

lationem, supersit quod sit satis
lation, there may remain that which may be sufficient

ad prohibendum empyreuma. Destillet congius.
to prevent empyreuma. Let a gallon distil.

Prop.—Carminative. Seldom used.

AQUA MENTHÆ PIPERITÆ.

WATER OF PEPPERMINT.

Recipe libram Menthæ piperitæ exsiccatæ* cum
Take a pound of Peppermint dried with

semisse; vel drachmas tres, pondere, Olei
half (a pound); or three drams, by weight, of Oil

Menthæ piperitæ.
of Peppermint.

Herbæ vel Oleo affunde tantum Aquæ,
To the Herb or to the Oil pour so much Water,

ut, post destillationem, supersit quod
that, after distillation, there may remain that which

sit satis ad prohibendum empyreuma.
may be sufficient to prevent empyreuma.

Destillet congius.
Let a gallon distil.

Prop.—Carminative. A very common vehicle for a variety of medicines.

---

* Ubi herba recens adhibetur, est utendum
When the fresh herb is employed, it is to be used

pondere duplo.
in a double proportion.

AQUA MENTHÆ VIRIDIS.

WATER OF SPEARMINT.

Recipe Menthæ viridis exsiccatæ* libram cum
Take of Spearmint dried a pound with

semisse; vel Olei Menthæ viridis, pondere,
half (a pound); or of Oil of Spearmint, by weight,

drachmas tres;
three drams;

Herbæ vel Oleo affunde tantum Aquæ,
To the Herb or to the Oil pour so much Water,

ut, post destillationem, supersit quod
that, after distillation, there may remain that which

sit satis ad prohibendum empyreuma.
may be sufficient to prevent empyreuma.

Destillet congius.
Let a gallon distil.

Prop.—Carminative. Like the preceding it is a very common vehicle for a variety of medicines.

AQUA PIMENTÆ.

WATER OF PIMENTA.

Recipe libram dimidiam Baccarum contusarum
Take half a pound of bruised Berries

Pimentæ; octarium Aquæ;
of Pimenta; a pint of Water;

---

* Ubi herba recens adhibetur, est utendum
When the fresh herb is employed, it is to be used

pondere duplo.
in a double proportion.

Macera Baccas in Aquâ per
Macerate the Berries in the Water for

viginti quatuor horas; tum adjice tantum Aquæ,
twenty-four hours; then add so much Water,

ut, post destillationem, supersit quod
that, after distillation, there may remain that which

sit satis ad prohibendum empyreuma.
may be sufficient to prevent empyreuma.

Destillet congius.
Let a gallon distil.

Prop.—Carminative. It may be used as a vehicle for other medicines in dyspepsia.

AQUA PULEGII.

WATER OF PENNYROYAL.

Recipe libram cum semisse Pulegii
Take a pound with half (a pound) of Pennyroyal

exsiccati;* vel drachmas tres, pondere, Olei
dried; or three drams, by weight, of Oil

Pulegii;
of Pennyroyal;

Herbæ vel Oleo affunde tantum Aquæ, ut,
To the Herb or Oil pour so much Water, that,

post destillationem, supersit quod sit
after distillation, there may remain that which may be

---

* Ubi herba recens adhibetur, est utendum
When the fresh herb is employed, it is to be used

pondere duplo.
in a double proportion.

satis	ad prohibendum	empyreuma.
sufficient	*to prevent*	*empyreuma.*

Destillet congius.
Let a gallon distil.

Used as a vehicle for other medicines, but not often employed.

AQUA ROSÆ.

WATER OF THE ROSE.

Recipe	Petalorum	Rosæ centifoliæ
Take	*of the Petals*	*of the hundred-leaved Rose*

libras octo;
eight pounds;

Affunde	his	tantum	Aquæ, ut,	post destil-
Pour	*to these*	*so much*	*Water, that,*	*after distil-*

lationem,	supersit	quod	sit	satis
lation,	*there remain*	*that which*	*may be*	*sufficient*

ad prohibendum	empyreuma.	Destillet congius.
to prevent	*empyreuma.*	*Let a gallon distil.*

As this water merely retains the odour of the rose, it may be used for forming collyria with such salts as are generally prescribed in those applications.

INFUSA.

INFUSIONS.

Infusions are watery solutions of vegetable matter. They ought, for the most part, not to be employed after being made longer than 24 hours in summer, or 48 hours in winter, as the vegetable matter they contain, soon evinces a disposition to undergo decomposition. In a well-regulated practice, infusions required during the day, should be made the first thing every morning, and those left of the preceding day, should be thrown away, and the vessels scalded. The same may be said of *Decoctions.*

INFUSUM ANTHEMIDIS.

INFUSION OF CHAMOMILE.

Recipe drachmas duas Florum Anthemidis;
Take two drams of the flowers of Chamomile;

octarium dimidium Aquæ ferventis;
half a pint of boiling Water;

Macera per sextam partem horæ, in vase
Macerate for the sixth part of an hour, in a vessel

levitèr clauso, et cola.
lightly covered, and strain.

Prop.—Stomachic, tonic. Drank copiously whilst warm, it excites nausea, and is generally employed to assist the action of emetics.—Dose, as a tonic, f℥j. to f℥ij., two or three times a-day.

INFUSUM ARMORACIÆ COMPOSITUM.

COMPOUND INFUSION OF HORSE-RADISH.

Recipe Radicis recentis Armoraciæ concisæ;
Take of fresh Root of Horse radish sliced;

Seminum Sinapis contusorum, singulorum
of Seeds of Mustard bruised, of each

unciam; fluidunciam Spiritûs compositi
an ounce; a fluid-ounce of the compound Spirit

Armoraciæ; Aquæ ferventis octarium;
of Horse-radish; of boiling Water a pint;

Macera Radicem per horas duas in Aquâ,
Macerate the Root for two hours in the Water,

in vase leviter clauso, et cola; tum adjice
in a vessel lightly covered, and strain; then add

Spiritum compositum Armoraciæ.
the compound Spirit of Horse-radish.

Prop.—Stimulant, diuretic. Given in paralysis, and dropsies occurring after intermittents.—Dose, f℥j. to f℥iij.

INFUSUM AURANTII COMPOSITUM.

COMPOUND INFUSION OF ORANGE.

Recipe Corticis exsiccati Aurantii drachmas duas;
Take of dried Rind of Orange two drams;

Corticis recentis Limonum drachmam;
of fresh Rind of Lemons a dram;

Caryophyllorum contusorum drachmam dimidiam;
of Cloves bruised half a dram;

Aquæ ferventis octarium dimidium;
of boiling Water half a pint;

Macera per quartam partem horæ in vase
Macerate for the fourth part of an hour in a vessel

leviter clauso, et cola.
lightly covered, and strain.

Prop.—Agreeably stomachic.—Dose, f℥j. to f℥iv. It may be employed as a vehicle for various tonics.

INFUSUM CALUMBÆ.

INFUSION OF CALUMBA.

Recipe Calumbæ concisæ drachmas duas;
Take of Calumba sliced two drams;

Aquæ ferventis octarium dimidium;
of boiling Water half a pint;

Macera per horas duas, in vase levitèr clauso,
Macerate for two hours, in a vessel lightly covered,

et cola.
and strain.

Prop.—Stomachic. Useful in dyspepsia, and for checking the sickness attendant upon pregnancy and cholera morbus, especially when conjoined with small doses of dilute nitric acid. As this infusion contains neither tannin nor gallic acid, it forms an elegant vehicle for the salts of iron.—Dose, f℥jss. to f℥iij.

INFUSUM CARYOPHYLLORUM.

INFUSION OF CLOVES.

Recipe drachmam Caryophyllorum contusorum;
Take a dram of bruised Cloves;

octarium dimidium Aquæ ferventis;
half a pint of boiling Water;

Macera per horas duas, in vase levitèr clauso,
Macerate for two hours, in a vessel lightly covered

et cola.
and strain.

Prop.—This infusion is a warm stomachic, and may either be given alone, or in conjunction with other remedies, in dyspepsia attended with a sense of coldness at the stomach, and in flatulent cholic, chronic gout, &c.—Dose, f℥j. to f℥ij., or more.

INFUSUM CASCARILLÆ.

INFUSION OF CASCARILLA.

Recipe Corticis Cascarillæ contusi,
Take of the Bark of Cascarilla bruised,

unciam dimidiam; Aquæ ferventis octarium dimidium;
half an ounce; of boiling Water half a pint;

Macera per horas duas, in vase levitèr clauso,
Macerate for two hours, in a vessel lightly covered,

et cola.
and strain.

Prop.—A light tonic, useful in a variety of cases, in which the heavier tonics are inadmissible.—Dose, f ℥iss. to f ℥iij.

INFUSUM CATECHU COMPOSITUM.

COMPOUND INFUSION OF CATECHU.

Recipe drachmas duas cum semisse Extracti
Take two drams with half (a dram) of the Extract

Catechu; drachmam dimidiam Corticis
of Catechu; half a dram of the Bark

Cinnamomi contusi; octarium dimidium
of Cinnamon bruised; half a pint

Aquæ ferventis;
of boiling Water;

Macera per horam in vase levitèr clauso,
Macerate for an hour in a vessel lightly covered,

et cola.
and strain.

Prop.—Powerfully astringent. Useful in chronic diarrhœas, &c. depending on intestinal debility.—Dose, f℥j. to f℥iij. after each liquid motion.

INFUSUM CINCHONÆ.

INFUSION OF CINCHONA.

Recipe unciam dimidiam Corticis Cinchonæ lancifoliæ
Take half an ounce of Bark of lance-leaved Cinchona

contusi; octarium dimidium Aquæ ferventis;
bruised; half a pint of boiling Water;

Macera per horas duas in vase levitèr clauso,
Macerate for two hours in a vessel lightly covered,

et cola.
and strain.

Prop.—This is a weak form for the exhibition of cinchona, agreeing with those stomachs that reject it in a more powerful form.—Dose, f℥j. to f℥iij.

INFUSUM CUSPARIÆ.

INFUSION OF CUSPARIA.

Recipe drachmas duas Corticis Cuspariæ contusi;
Take two drams of the Bark of Cusparia bruised;

Aquæ ferventis octarium dimidium;
of boiling Water half a pint;

Macera per horas duas, in vase levitèr clauso,
Macerate for two hours, in a vessel lightly covered,

et cola.
and strain.

Prop.—Stimulant, tonic. It may be advantageously conjoined with tincture of cinnamon.—Dose, f℥j. to f℥iij.

INFUSUM DIGITALIS.

INFUSION OF DIGITALIS.

Recipe drachmam Foliorum exsiccatorum Digitalis;
Take a dram of the dried Leaves of Digitalis;

fluidunciam dimidiam Spiritûs Cinnamomi;
ha f a fluid-ounce of the Spirit of Cinnamon;

octarium dimidium Aquæ ferventis;
half a pint of boiling Water;

Macera	per horas quatuor	in vase	levitèr
Macerate	*for four hours*	*in a vessel*	*lightly*

clauso, et	cola;	tum	adjice	Spiritum.
covered, and	*strain;*	*then*	*add*	*the Spirit.*

Two fluid-drams of this infusion are about equal to one grain of digitalis in powder.

The properties of Digitalis have already been mentioned at page 29.—Dose, f℥ss. to f℥j. every eight hours when the case is urgent, if the patient can bear it.

INFUSUM GENTIANÆ COMPOSITUM.

COMPOUND INFUSION OF GENTIAN.

Recipe	Radicis Gentianæ	concisæ,	Corticis exsiccati
Take	*of the Root of Gentian*	*sliced,*	*of the dried Rind*

Aurantii,	singulorum	drachmam;	Corticis recentis
of Orange,	*of each*	*a dram;*	*of the fresh Rind*

Limonum	drachmas duas;	Aquæ ferventis
of Lemons	*two drams;*	*of boiling Water*

fluiduncias duodecim;
twelve fluid-ounces;

Macera	per horam	in vase	levitèr	clauso,
Macerate	*for an hour*	*in a vessel*	*lightly*	*covered,*

et cola.
and strain.

Prop.—Tonic, stomachic.—Dose, f℥j. to f℥ij.

INFUSUM LINI COMPOSITUM.

COMPOUND INFUSION OF LINSEED.

Recipe	unciam	Seminum	Lini usitatissimi
Take	*an ounce*	*of the Seeds*	*of common Flax*

contusorum; unciam dimidiam Radicis
bruised; half an ounce of the Root

Glycyrrhizæ concisæ; octarios duos Aquæ ferventis;
of Liquorice sliced; two pints of boiling Water;

Macera per horas quatuor, prope ignem, in vase
Macerate for four hours, near the fire, in a vessel

levitèr clauso, et cola.
lightly covered, and strain.

Prop.—Demulcent.—Dose, *ad libitum.*

INFUSUM QUASSIÆ.

INFUSION OF QUASSIA.

Recipe scrupulum Ligni Quassiæ concisi;
Take a scruple of the Wood of Quassia chipped;

octarium dimidium Aquæ ferventis;
half a pint of boiling Water;

Macera per horas duas, in vase levitèr clauso,
Macerate for two hours, in a vessel lightly covered,

et cola.
and strain.

Prop.—A light tonic.—Dose, f℥j. to f℥iij. This infusion, like that of calumba, is an useful vehicle for the salts of iron, as neither gallic acid nor tannin are present in it.

INFUSUM RHEI.

INFUSION OF RHUBARB.

Recipe drachmam Radicis Rhei concisæ;
Take a dram of the Root of Rhubarb sliced;

octarium dimidium Aquæ ferventis;
half a pint of boiling Water;

Macera per horas duas in vase levitèr clauso,
Macerate for two hours in a vessel lightly covered,

et cola.
and strain.

Prop.—Aperient, in doses of f℥j. to f℥iv., in conjunction with neutral salts, or aromatics, according as the case may require.

INFUSUM ROSÆ COMPOSITUM.

COMPOUND INFUSION OF THE ROSE.

Recipe unciam dimidiam Petalorum
Take half an ounce of the Petals

Rosæ Gallicæ exsiccatorum;
of the French Rose (red Rose) dried;

fluidrachmas tres Acidi sulphurici diluti; unciam
three fluid-drams of dilute sulphuric Acid; an ounce

cum semisse Sacchari purificati; octarios duos
and a half of purified Sugar; two pints

cum semisse Aquæ ferventis;
and a half of boiling water;

Superinfunde Aquam Petalis Rosæ
Pour the Water to the Petals of the Rose

in vase vitreo; dein immisce Acidum, et macera
in a glass vessel; then mix in the Acid, and macerate

per horam dimidiam. Denique, cola liquorem,
for half an hour. Lastly, strain the liquor,

que adjice Saccharum ei.
and add the Sugar to it.

This is an useful vehicle for sulphate of magnesia, and other saline medicines.

INFUSUM SENNÆ COMPOSITUM.

COMPOUND INFUSION OF SENNA.

Recipe unciam cum semisse Foliorum
Take an ounce with half (an ounce) of the Leaves

Sennæ; drachmam Radicis Zingiberis concisæ;
of Senna; a dram of the Root of Ginger sliced;

octarium Aquæ ferventis;
a pint of boiling Water;

Macera per horam in vase levitèr clauso,
Macerate for an hour in a vessel lightly covered,

et cola liquorem.
and strain the liquor.

Prop.—Purgative The ginger corrects the griping properties of the senna. This infusion may advantageously be combined with sulphate of magnesia.—Dose, f℥ij. to f℥iv.

INFUSUM SIMAROUBÆ.

INFUSION OF SIMAROUBA.

Recipe drachmam dimidiam Corticis contusi
Take half a dram of bruised Bark

Simaroubæ; octarium dimidium Aquæ ferventis;
of Simarouba; half a pint of boiling Water;

Macera per horas duas in vase levitèr clauso,
Macerate for two hours in a vessel lightly covered,

et cola.
and strain.

Prop.—Tonic. It may be given advantageously in intermittent fever, dyspepsia, obstinate cases of dysentery and diarrhœa, and fluor albus. It should be conjoined with aromatics or opium.—DOSE, f℥ij., or more.

INFUSUM TABACI.

INFUSION OF TOBACCO.

Recipe drachmam Foliorum Tabaci, octarium
Take a dram of the Leaves of Tobacco, a pint

Aquæ ferventis ;
of boiling Water :

Macera per horam in vase levitèr clauso,
Macerate for an hour in a vessel lightly covered,

et cola.
and strain.

Useful, when administered in the form of enema, in incarcerated hernia, ileus, colica pictonum, dysury, &c. It was formerly employed in this way in cases of suspended animation, but experience has shewn the impropriety of exhibiting it in such cases.

MUCILAGINES.

MUCILAGES.

MUCILAGO ACACIÆ.

MUCILAGE OF ACACIA.

Recipe uncias quatuor Gummi Acaciæ contriti ;
Take four ounces of the Gum of Acacia powdered;

octarium dimidium Aquæ ferventis ;
half a pint of boiling Water ;

Tere Gummi cum Aquâ paulatim instillatâ,
Rub the Gum with the Water gradually dropped in,

donec abeat in mucilaginem.
until it form into a mucilage.

This mucilage should be strained through linen to free it from impurities.

Prop.—Demulcent. It may be given in tickling coughs; and, when combined with opium, it is of service in diarrhœa, dysentery, ardor urinæ, &c.—Dose, when given without opium, *ad libitum.*—Off. Prep.—*Mistura Guaiaci.*

MUCILAGO AMYLI.

MUCILAGE OF STARCH.

Recipe drachmas tres Amyli; octarium Aquæ;
Take three drams of Starch; a pint of Water;

Tere Amylum cum Aquâ paulatim instillatâ;
Rub the Starch with the Water gradually dropped in;

dein coque donec abeat in mucilaginem.
then boil until it form into a mucilage.

The common starch used by laundresses ought not to be employed, as it contains *smalt*, which is powdered glass coloured with cobalt.

Mucilage of starch is given as a demulcent in phthisis, abrasions of the stomach, &c. It is also employed in form of enema, in diarrhœa, dysentery, &c., and in this form it is an useful vehicle for opium.

DECOCTA.

DECOCTIONS.

Decoctions, like infusions, are aqueous solutions of vegetable matter. The boiling is intended to extract more of the soluble parts of the vegetable than can be effected by infusion ; but if any part be volatile, it will be dissipated with the vapour of the water ; if extractive matter, long boiling will cause oxygen to be absorbed from the atmosphere, and then the extractive matter precipitates, and is rendered inert.

Decoctions, like infusions, cannot be preserved long without undergoing decomposition.

DECOCTUM ALOES COMPOSITUM.

COMPOUND DECOCTION OF ALOES.

Recipe Extracti Glycyrrhizæ semunciam ;
Take of the Extract of Liquorice half an ounce ;

Subcarbonatis Potassæ scrupulos duos ;
of the Subcarbonate of Potash two scruples ;

Extracti Aloës spicatæ contriti ; Myrrhæ
of the Extract of spiked Aloes powdered ; of Myrrh

contritæ ; Stigmatum Croci, singulorum
powdered ; of the Stigmata of Saffron, of each

drachmam ; Tincturæ compositæ Cardamomi
a dram ; of compound Tincture of Cardamom

fluiduncias quatuor ; Aquæ octarium.
four fluid-ounces ; of Water a pint.

Decoque Glycyrrhizam, Subcarbonatem Potassæ,
Boil down the Liquorice, the Subcarbonate of Potash,

Alöen, Myrrham, et Stigmata Croci,
the Aloes, the Myrrh, and the Stigmata of Saffron,

cum Aquâ, ad fluiduncias duodecim, et cola;
with the Water, to twelve fluid-ounces, and strain;

tum adjice Tincturam compositam Cardamomi.
then add the compound Tincture of Cardamom.

Prop. — Gently cathartic, and emmenagogue.— Dose, f℥ss. to f℥ij. It should in general be taken early in the morning.

DECOCTUM CINCHONÆ.

DECOCTION OF CINCHONA.

Recipe unciam Corticis Cinchonæ lancifoliæ
Take an ounce of the Bark of lance-leaved Cinchona

contusi; octarium Aquæ;
bruised; a pint of Water;

Coque per sextam partem horæ in vase
Boil for the sixth part of an hour in a vessel

levitèr clauso, et cola liquorem adhuc calentem.
lightly covered, and strain the liquor whilst hot.

The boiling ought not to exceed ten minutes, and the vessel should be closely covered during that time, otherwise oxygen is absorbed, and the extractive matter precipitated and rendered inert.

Prop. and Dose.—The same as those of the *Infusum Cinchonæ*, which see.

DECOCTUM CYDONIÆ.

DECOCTION OF QUINCE (SEEDS).

Recipe drachmas duas Seminum Cydoniæ;
Take two drams of the Seeds of the Quince;

octarium Aquæ;
a pint of Water;

Coque lento igne per sextam partem horæ;
Boil with a slow fire for the sixth part of an hour;

dein cola.
then strain.

Prop.—Demulcent. It may be employed in the same cases as the other demulcents. This decoction very soon undergoes decomposition.

DECOCTUM DULCAMARÆ.

DECOCTION OF BITTER-SWEET.

Recipe unciam Caulis Dulcamaræ concisi;
Take an ounce of the Stalk of Bitter-sweet sliced;

octarium cum semisse Aquæ;
a pint with half (a pint) of Water;

Decoque ad octarium et cola.
Boil down to a pint and strain.

Prop.—Diuretic, narcotic. This is an useful form for exhibiting *Dulcamara*, which is said to be serviceable in humoral asthma, dropsy, and some diseases of the skin.—Dose, fʒiv. to f℥j. combined with some aromatic.

DECOCTUM HORDEI.

DECOCTION OF BARLEY.

Recipe uncias duas Seminum Hordei;
Take two ounces of the Seeds of Barley;

octarios quatuor cum semisse Aquæ;
four pints with half (a pint) of Water;

Primùm ablue res alienas
First wash away the extraneous substances

adhærentes Seminibus Hordei Aquâ frigidâ;
adhering to the Seeds of the Barley (with) cold Water;

deindè, octario dimidio aquæ affuso,
then, half a pint of water being poured thereon,

coque Semina paulisper. Hâc aquâ
boil the Seeds a little while. This water

abjectâ, superinfunde quod est
being thrown away, pour thereon that which is

reliquum, priùs fervefactum; tum decoque
left, first made hot; then boil down

ad octarios duos, et cola.
to two pints, and strain.

DECOCTUM HORDEI COMPOSITUM.

COMPOUND DECOCTION OF BARLEY.

Recipe octarios duos Decocti Hordei;
Take two pints of the Decoction of Barley;

uncias duas Fructûs Caricæ concisi;
two ounces of the Fruit of the Fig (Figs) sliced;

unciam dimidiam Radicis Glycyrrhizæ concisæ
half an ounce of the Root of Liquorice sliced

et contusæ; uncias duas Uvarum passarum,
and bruised; two ounces of dried Grapes (Raisins),

acinis demptis; octarium Aquæ;
the stones being taken away; a pint of Water;

Decoque ad octarios duos, et cola.
Boil down to two pints, and strain.

The simple and compound decoctions of barley are useful demulcents in a variety of cases requiring such remedies. They may be taken *ad libitum.* Should the compound decoction prove too laxative, a very small quantity of tincture of opium may be added to it.

DECOCTUM LICHENIS.

DECOCTION OF ICELAND MOSS.

Recipe unciam Lichenis; octarium Aquæ
Take an ounce of Iceland Moss; a pint of Water

cum semisse;
with half (a pint);

Decoque ad octarium, et cola.
Boil down to a pint, and strain.

PROP.—Demulcent, and a light tonic.—DOSE, f℥ij. or more.

DECOCTUM MALVÆ COMPOSITUM.

COMPOUND DECOCTION OF THE MALLOW.

Recipe unciam Malvæ exsiccatæ; unciam dimidiam
Take an ounce of dried Mallow; half an ounce

Florum exsiccatorum Anthemidis; octarium
of the dried Flowers of Chamomile; a pint

Aquæ;
of Water;

Coque per quartam partem horæ, et cola.
Boil for the fourth part of an hour, and strain.

Only employed as an emollient in fomentations and enemas.

DECOCTUM PAPAVERIS.

DECOCTION OF THE POPPY.

Recipe uncias quatuor Capsularum Papaveris
Take four ounces of the Capsules of the Poppy

concisarum; octarios quatuor Aquæ;
sliced; four pints of Water;

Coque per quartam partem horæ, et cola.
Boil for the fourth part of an hour, and strain.

This decoction forms an useful, emollient, and anodyne fomentation, applicable in a variety of cases.

DECOCTUM QUERCUS.

DECOCTION OF OAK (BARK).

Recipe unciam Corticis Quercûs; octarios duos
Take an ounce of the Bark of Oak; two pints

Aquæ;
of Water;

Decoque ad octarium, et cola.
Boil down to a pint, and strain.

Chiefly employed as a local astringent in leucorrhœa, in passive uterine hæmorhages, in relaxations of the uvula, and in a variety of other cases requiring astringent applications.

DECOCTUM SARSAPARILLÆ.

DECOCTION OF SARSAPARILLA.

Recipe uncias quatuor Radicis Sarsaparillæ
Take four ounces of the Root of Sarsaparilla

concisæ; octarios quatuor Aquæ ferventis;
sliced; four pints of boiling Water;

Macera per horas quatuor, in vase levitèr
Macerate for four hours, in a vessel lightly

clauso prope ignem; dein exime radicem
covered near the fire; then take out the root

Sarsaparillæ et contunde; redde contusam
of Sarsaparilla and bruise (it); return (it) (when) bruised

liquori, et macera iterum simili modo
to the liquor, and macerate again in a like manner

per horas duas, dein decoque ad octarios duos, et
for two hours, then boil down to two pints, and

cola.
strain.

The virtues of sarsaparilla are much impaired by following the above directions. It is sufficient to bruise the root and macerate it in hot water. The active principle resides in the bark of the root. For Properties, &c., see page 61.—Dose, f℥iv. to Oss. three or four times a-day.

DECOCTUM SARSAPARILLÆ COMPOSITUM.

COMPOUND DECOCTION OF SARSAPARILLA.

Recipe Decocti Sarsaparillæ ferventis
Take of the Decoction of Sarsaparilla boiling

octarios quatuor; Radicis Sassafras concisæ;
four pints; of the Root of Sassafras sliced;

Ligni Guaiaci rasi; Radicis
of the Wood of Guaiacum rasped; of the Root

Glycyrrhizæ contusæ, singulorum unciam;
of Liquorice bruised, of each an ounce;

Corticis Radicis Mezerei drachmas tres;
of the Bark of the Root of Mezereon three drams;

Decoque per quartam partem horæ, et cola.
Boil down for the fourth part of an hour, and strain.

Prop.—This preparation, the virtues of which chiefly reside in the mezereon, is considered diaphoretic, and alterative. It is usually given in the secondary stage of syphilis, in chronic rheumatism, and in some cutaneous diseases. See Prop. of the ingredients in the Materia Medica.—Dose, f℥iv. to Oss. three or four times a-day.

DECOCTUM SENEGÆ.

DECOCTION OF SENEGA.

Recipe unciam Radicis Senegæ; octarios duos
Take an ounce of the Root of Senega; two pints

Aquæ;
of Water;

Decoque ad octarium, et cola.
Boil down to a pint, and strain.

See *Senegæ Radix*, page 63.--DOSE, f℥jss. to f℥iij. three or four times a-day.

DECOCTUM ULMI.

DECOCTION OF ELM (BARK).

Recipe uncias quatuor Corticis recentis Ulmi
Take four ounces of fresh Bark of the Elm

contusi; octarios quatuor Aquæ;
bruised; four pints of Water;

Decoque ad octarios duos, et cola.
Boil down to two pints, and strain.

See *Ulmi Cortex*, page 75.—DOSE, f℥iv. to f℥vj.

DECOCTUM VERATRI.

DECOCTION OF (WHITE) HELLEBORE.

Recipe unciam Radicis Veratri
Take an ounce of the root of (white) Hellebore

contritæ; octarios duos Aquæ; fluid-uncias duas
powdered; two pints of Water; two fluid-ounces

Spiritûs rectificati;
of rectified Spirit;

Decoque *Boil down*	Radicem *the Root*	Veratri *of (white) Hellebore*

ex Aquâ ad octarium, et
from the (whole quantity of) Water to a pint, and

cola; tum, postquam refrixerit, adjice
strain; then, after it shall have cooled, add

Spiritum.
the Spirit.

Employed externally as a lotion in tinea capitis, and other cutaneous diseases, but it must be used with caution.

EXTRACTA.

EXTRACTS.

Extracts are those substances which are obtained by evaporating aqueous or spirituous solutions of vegetable matters to a proper consistence. Spirit of wine is employed as a solvent when any resinous principle in the plant is required to be dissolved. This mode of preparing vegetable products is not without its objections, as the heat volatilizes some parts, while the extractive matter is rendered insoluble and inert by the absorption of oxygen from the air. It will be observed that the College places the inspissated juice of some plants under this class of preparations: that which is called *extract of elaterium*, is merely the fecula of the expressed juice of the fruit.

The term *extractive matter*, which we sometimes meet with in authors, is not applicable to any distinct and unvarying principle obtained from plants, as each plant is found to contain its own peculiar extractive, the characters of which depend upon the presence of proximate principles, varying according to the plant employed. The same may be said of the *bitter principle.*

In præparandis Extractis omnibus, consume
In preparing all Extracts, evaporate

humorem quamprimùm balneo aquoso, in patinâ,
the moisture as soon as possible in a water bath, in a pan,

donec crassitudo idonea fiat ad fingendas pilulas,
until a proper thickness be made to form pills,

et sub finem move assiduè spathâ.
and towards the end stir constantly with a spatula.

Insperge Extractis omnibus mollioribus
Sprinkle upon all the softer Extracts

paululum Spiritûs rectificati.
a little rectified Spirit.

EXTRACTUM ACONITI.

EXTRACT OF ACONITE.

Recipe libram Foliorum recentium Aconiti;
Take a pound of fresh leaves of Aconite;

Contunde in mortario lapideo, insperso
Bruise (them) in a stone mortar, sprinkled

exiguo aquæ; dein exprime succum, que
with a little water; then express the juice, and

consume eum non defæcatum,
evaporate it not strained, (i. e. *without straining*)

donec habeat idoneam crassitudinem.
until it acquire a proper consistence.

For Prop. &c., see *Aconiti Folia*, page 10.—Dose, gr. $\frac{1}{2}$ at first, which may be gradually increased to gr. vj. morning and evening.

EXTRACTUM ALOES PURIFICATUM.

PURIFIED EXTRACT OF ALOES.

Recipe Extracti Aloës spicatæ contriti libram;
Take of Extract of spiked Aloes powdered a pound;

Aquæ ferventis congium;
of boiling Water a gallon;

Macera per triduum leni calore; dein cola,
Macerate for three days with a gentle heat; then strain,

et sepone, ut fæces subsidant. Effunde
and set aside, that the dregs may subside. Pour off

liquorem defæcatum, et consume donec habeat
the strained liquor, and evaporate until it acquire

idoneam crassitudinem.
a proper consistence.

For Prop. &c., see *Aloes spicatæ extractum*, page 11. —Dose, gr. x. to gr. xv.

EXTRACTUM ANTHEMIDIS.

EXTRACT OF CHAMOMILE.

Recipe Florum exsiccatorum Anthemidis libram;
Take of dried Flowers of Chamomile a pound;

Aquæ congium;
of Water a gallon;

Decoque ad octarios quatuor, et cola li uorem
Boil down to four pints, and strain the liquor

adhuc calentem; denique, consume eum donec
whilst hot; lastly, evaporate it until

habeat idoneam crassitudinem.
it acquire a proper consistence.

The essential oil of the chamomile is dissipated by boiling. The bitter extract which is left may be used as a stomachic in conjunction with rhubarb, &c. in doses of gr. x. or more.

EXTRACTUM BELLADONNÆ.

EXTRACT OF BELLADONNA.

Recipe libram Foliorum recentium Belladonnæ;
Take a pound of fresh Leaves of Belladonna;

Contunde in mortario lapideo, insperso
Bruise (them) in a stone mortar, sprinkled

exiguo aquæ; dein exprime succum, que
with a little water; then express the juice, and

consume eum, non defæcatum
evaporate it, not strained (i. e. *without straining*),

donec habeat idoneam crassitudinem.
until it acquire a proper consistence.

The virtues of this inspissated juice are the same as those of the plant, in a milder degree. Applied to the eye, it produces great dilatation of the pupil, and is employed for this purpose previously to the operation for cataract.—Dose, when given internally, gr. j. to gr. v.; but it must be exhibited with caution on account of its poisonous quality.

EXTRACTUM CINCHONÆ.

EXTRACT OF CINCHONA.

Recipe libram Corticis contusi Cinchonæ lancifoliæ;
Take a pound of bruised Bark of lance-leaved Cinchona;

congium Aquæ;
a gallon of Water;

Decoque ad octarios sex, et cola liquorem
Boil down to six pints, and strain the liquor

adhuc calentem. Eodem modo decoque
whilst hot. In the same manner boil down

ex pari mensurâ Aquæ quater, et cola.
from the like measure of Water four times, and strain.

Denique, consume liquores omnes mistos in unum,
Lastly, evaporate all the liquors mixed into one,

donec habeant idoneam crassitudinem.
until they acquire a proper consistence.

Hoc Extractum debet servari MOLLE, quod sit
This Extract ought to be kept soft, which may be

aptum ad fingendas pilulas, et DURUM, quod
fit to form pills, and hard, which

possit teri in pulverem.
may be able to be rubbed into a powder.

The virtues of Cinchona are considerably weakened by this mode of preparation, which will be readily understood from what has been said under the head of *Decoctions*, page 229, and under *Decoctum Cinchonæ*, page 230. It nevertheless retains some of the active principle of cinchona, and, like the decoction, and infusion, may be given to those whose stomachs reject cinchona in powder.—DOSE, gr. x. to ʒss., dissolved in distilled water: the whole, however, is not soluble, owing to the oxdizement of the extractive by the boiling employed in the process.

EXTRACTUM CINCHONÆ RESINOSUM.

RESINOUS EXTRACT OF CINCHONA.

Recipe libras duas Corticis contusi
Take two pounds of the bruised Bark

Cinchonæ lancifoliæ; congium Spiritûs rectificati;
of lance-leaved Cinchona; a gallon of rectified Spirit;

Macera per dies quatuor, et cola.
Macerate for four days, and strain.

Destillet tinctura balneo aquoso, donec habeat
Let the tincture distil in a water bath, until it acquire

idoneam crassitudinem.
a proper consistence.

By this mode of preparation, those substances on which the active properties of bark depend, are not so liable to be altered or decomposed as in making the former extract. Mr. Brande says, "it is customary to doubt the efficacy of all the extracts of bark, but, we think, without sufficient reason, and their convenience often recommends them."—Dose, gr. x. to ʒss.

EXTRACTUM COLOCYNTHIDIS.

EXTRACT OF COLOCYNTH.

Recipe libram Pulpæ Colocynthidis; congium
Take a pound of the Pulp of Colocynth; a gallon

Aquæ;
of Water;

Decoque ad octarios quatuor, et cola liquorem
Boil down to four pints, and strain the liquor

adhuc calentem; denique, consume eum donec
whilst hot; lastly, evaporate it until

habeat idoneam crassitudinem.
it acquire a proper consistence.

It has already been stated that the pulp of colocynth is too drastic a cathartic to admit of ordinary exhibition. This inconvenience is obviated by the above form of preparation, which constitutes an useful cathartic, especially when conjoined with calomel.—Dose, gr. v. to ʒss.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM.

COMPOUND EXTRACT OF COLOCYNTH.

Recipe uncias sex Pulpæ Colocynthidis concisæ;
Take six ounces of the Pulp of Colocynth sliced;

uncias duodecim Extracti Aloës spicatæ
twelve ounces of the Extract of Spiked Aloes

contriti; uncias quatuor Gummi-resinæ
powdered; four ounces of the Gum-resin

Scammoneæ contritæ; unciam Seminum
of Scammony powdered; an ounce of the Seeds

Cardamomi contritorum; uncias tres
of Cardamom powdered; three ounces

Saponis duri; congium Spiritûs tenuioris;
of hard Soap; a gallon of proof Spirit;

Macera Pulpam Colocynthidis in Spiritu
Macerate the Pulp of Colocynth in the Spirit

leni calore, per quatriduum. Cola liquorem,
with a gentle heat, for four days. Strain the liquor,

que adjice Aloën, Scammoneam, et Saponem ei;
and add the Aloes, the Scammony, and the Soap to it;

dein consume Spiritum, donec habeat
then evaporate the Spirit, until it acquire

idoneam crassitudinem, et, sub finem, admisce
a proper consistence, and, towards the end, mix in

Semina Cardamomi.
the Seeds of Cardamom.

This combination of cathartics is extremely useful in a variety of cases. Like the former preparation, it may be advantageously combined with calomel.—Dose, gr. v. to ℈j.

EXTRACTUM CONII.

EXTRACT OF HEMLOCK.

Recipe libram Conii recentis;
Take a pound of fresh Hemlock;

Contunde in mortario lapideo, insperso exiguo
Bruise it) in a stone mortar, sprinkled with a little

aquæ; dein exprime succum, que consume eum
water; then express the juice, and evaporate it

non defæcatum, donec
not strained (i. e.) *without straining*), *until*

habeat idoneam crassitudinem.
it acquire a proper consistence.

The narcotic properties of hemlock are considerably diminished by subjecting it to this form of preparation. After this extract has been kept some time, its surface becomes covered with a crystalline efflorescence, and then it is nearly inert.—Dose, gr. iij. cautiously increased to ℈j.

EXTRACTUM ELATERII.

EXTRACT OF ELATERIUM.

Scinde Pepones maturos Elaterii, et
Cut the ripe Fruit of wild Cucumber, and

cola succum levissimè expressum
strain the juice lightly expressed

per cribrum setaceum tenuissimum in vas vitreum;
through a very fi e hair sieve into a glass vessel;

deinde sepone per aliquot horas, donec
then set (it) aside for some hours, until

crassior pars subsederit. Parte tenuiore su-
the thicker part shall have subsided. The supernatant

pernatante rejectâ, exsicca partem crassiorem
thinner part being rejected, dry the thicker part

leni calore.
with a gentle heat.

The active principle of the fecula of the juice of elaterium has been termed *elatin* by Dr. Paris.

PROP.—Extract of elaterium is a very drastic hydragogue cathartic. It is chiefly employed in ascites, and in cases of very obstinate costiveness.—DOSE, gr. $\frac{1}{8}$ at intervals of four hours.

EXTRACTUM GENTIANÆ.

EXTRACT OF GENTIAN.

Recipe libram Radicis Gentianæ concisæ;
Take a pound of the Root of Gentian sliced;

congium Aquæ ferventis;
a gallon of boiling Water;

Macera per horas viginti quatuor; tum decoque
Macerate for twenty-four hours; then boil down

ad octarios quatuor, et cola liquorem, adhuc
to four pints, and strain the liquor, whilst

calentem; denique, consume eum, donec habeat
hot; lastly, evaporate it, until it acquire

idoneam crassitudinem.
a proper consistence.

PROP.—Tonic, stomachic. It is often employed as a vehicle for other medicines having similar properties and which require to be given in small doses.—DOSE, gr x. to ʒss.

EXTRACTUM GLYCYRRHIZÆ.

EXTRACT OF LIQUORICE.

Recipe libram Radicis Glycyrrhizæ concisæ;
Take a pound of the Root of Liquorice sliced;

congium Aquæ ferventis;
a gallon of boiling water;

Macera per horas viginti quatuor; tum decoque
Macerate for twenty-four hours; then boil down

ad octarios quatuor, et cola liquorem adhuc
to four pints, and strain the liquor whilst

calentem; denique, consume eum, donec habeat
hot; lastly, evaporate it, until it acquire

idoneam crassitudinem.
a proper consistence.

The extract of liquorice sold in the shops may be substituted for this preparation. Extract of liquorice is one of the most useful of the demulcents for allaying tickling coughs. It may be taken *ad libitum*,

EXTRACTUM HÆMATOXYLI.

EXTRACT OF LOGWOOD.

Recipe libram Ligni Hæmatoxyli
Take a pound of the Wood of Hæmatoxylon (Logwood)

contriti; congium Aquæ ferventis;
powdered; a gallon of boiling Water;

Macera per horas viginti quatuor; tum decoque
Macerate for twenty-four hours; then boil down

ad octarios quatuor, et cola liquorem adhuc
to four pints, and strain the liquor whilst

calentem; denique, consume eum, donec habeat
hot; lastly, evaporate it, until it acquire

idoneam crassitudinem.
a proper consistence.

Prop.—Astringent. Given in chronic diarrhœa, and dysentery.—Dose, gr. x. to ʒss., in any of the distilled waters.

EXTRACTUM HUMULI.

EXTRACT OF THE HOP.

Recipe uncias quatuor Strobilorum* Humuli;
Take four ounces of the Strobiles of the Hop;

congium Aquæ;
a gallon of Water;

Decoque ad octarios quatuor, et cola liquorem
Boil down to four pints, and strain the liquor

adhuc calentem; denique, consume eum donec
whilst hot; lastly, evaporate it until

habeat idoneam crassitudinem.
it acquire a proper consistence.

For properties, &c. see page 36—Dose. gr. v. to ℈j. either in pill or solution. This extract may be given in some cases where opium is not admissible.

EXTRACTUM HYOSCYAMI.

EXTRACT OF HENBANE.

Recipe libram Foliorum recentium Hyoscyami;
Take a pound of Fresh Leaves of Henbane;

---

* *Strobilus* signifies an *artichoke*, the flower of which that of the hop resembles in structure—whence the name.

Contunde in mortario lapideo, insperso
Bruise (them) in a stone mortar, sprinkled

exiguo Aquæ; dein exprime succum, que
with a little Water; then express the juice, and

consume eum non defæcatum
evaporate it not strained (i. e. *without straining*),

donec habeat idoneam crassitudinem.
until it acquire a proper consistence.

For Properties, &c. see page 37.—DOSE, gr. iij. to ℈j. in form of pill.

EXTRACTUM JALAPÆ.

EXTRACT OF JALAP.

Recipe libram Radicis Jalapæ contritæ;
Take a pound of the Root of Jalap powdered;

octarios quatuor Spiritûs rectificati; congium
four pints of rectified Spirit; a gallon

Aquæ;
of Water;

Macera Radicem Jalapæ in Spiritu
Macerate the Root of Jalap in the Spirit

per quatriduum, et effunde tincturam. Decoque
for four days, and pour off the tincture. boil down

residuum ex Aquâ
the residue from the (whole quantity of) Water

ad octarios duos. Dein cola tincturam et decoctum
to two pints. Then strain the tincture and decoction

separatim; et hoc consumatur;
separately; and let this (the decoction) be evaporated;

illa destillet, donec utrumque
let that (the tincture) distil, until each

spissescat. Postremò, misce Extractum
becomes thick. Lastly, mix the Extract

cum Resinâ, et consume donec habeat
with the Resin, and evaporate until it acquire

idoneam crassitudinem.
a proper consistence.

Hoc Extractum servetur MOLLE, quod sit
This Extract should be kept soft, which may be

aptum ad fingendas pilulas, et DURUM, quod
fit to form pills, and hard, which

possit teri in pulverem.
may be able to be rubbed into a powder.

The Properties and Dose are the same as those of the root in powder. See page 37.

EXTRACTUM LACTUCÆ.

EXTRACT OF LETTUCE.

Recipe libram foliorum recentium Lactucæ;
Take a pound of fresh leaves of Lettuce;

Contunde in mortario lapideo, insperso
Bruise (them) in a stone mortar, sprinkled

exiguo Aquæ: dein exprime succum, que
with a little Water: then express the juice, and

consume eum non defæcatum
evaporate it not strained (i. e. *without straining*),

donec habeat idoneam crassitudinem.
until it acquire a proper consistence.

See *Lactuca*, page 38. Employed in the place of opium for allaying irritation.—DOSE, gr. vj. which may be gradually augmented.

EXTRACTUM OPII.

EXTRACT OF OPIUM.

Recipe uncias sedecim Opii concisi congium
Take sixteen ounces of Opium sliced; a gallon

Aquæ;
of Water;

Adjice exiguum aquæ Opio, et
Add a little of the water to the Opium, and

macera per horas duodecim, ut mollescat;
macerate for twelve hours, that it may grow soft;

tum, reliquâ Aquâ instillatâ paulatim,
then, the remaining Water being dropped in gradually,

tere donec misceantur quàm optimè, et
rub (them) until they are mixed as well as possible, and

sepone, ut fæces subsidant; dein cola
set aside, that the dregs may subside; then strain

liquorem, et consume, donec habeat idoneam
the liquor, and evaporate, until it acquire a proper

crassitudinem.
consistence.

This extract contains *morphia* and some *narcotine.* The latter may be entirely removed by agitating the extract with æther, when it has become of the consistence of syrup. When the æther, by distillation, passes over without depositing any crystals of narcotine, the whole of that principle is removed; but if any crystals appear, the operation must be repeated with fresh portions of æther until crystals are no longer afforded by distillation.

Prop.—This extract is not so unpleasant in its operation as opium.—Dose, gr. j. to gr. vj.

EXTRACTUM PAPAVERIS.

EXTRACT OF POPPY.

Recipe libram Capsularum contusarum Papaveris,
Take a pound of the bruised Capsules of the Poppy,

demptis seminibus; congium Aquæ ferventis;
deprived of the Seeds; a gallon of boiling Water;

Macera per horas viginti quatuor; tum decoque
Macerate for twenty-four hours; then boil down

ad octarios quatuor, et cola liquorem adhuc
to four pints, and strain the liquor whilst

calentem; denique, consume eum, donec habeat
hot; lastly, evaporate it, until it acquire

idoneam crassitudinem.
a proper consistence.

Prop.—This extract acts as a narcotic, without producing the unpleasant effects which follow the exhibition of opium.—Dose. gr. ij. to ℈j.

EXTRACTUM RHEI.

EXTRACT OF RHUBARB.

Recipe libram Radicis contritæ Rhei;
Take a pound of the powdered Root of Rhubarb;

octarium Spiritûs tenuioris; octarios septem Aquæ;
a pint of proof Spirit; seven pints of Water;

Macera per quatriduum leni calore; dein
Macerate for four days with a gentle heat; then

cola, et sepone, ut fæces subsidant.
strain, and set aside, that the dregs may subside.

Effunde liquorem, que consume eum defæcatum,
Pour off the liquor, and evaporate it (when) strained,

donec habeat idoneam crassitudinem.
until it acquire a proper consistence.

The purgative properties of rhubarb are somewhat deteriorated by this mode of preparation.—Dose, gr. x. to ʒss.

EXTRACTUM SARSAPARILLÆ.

EXTRACT OF SARSAPARILLA.

Recipe libram Radicis concisæ Sarsaparillæ;
Take a pound of the sliced Root of Sarsaparilla;

congium Aquæ ferventis;
a gallon of boiling water;

Macera per horas viginti quatuor; tum decoque
Macerate for twenty-four hours; then boil down

ad octarios quatuor, et cola liquorem adhuc
to four pints, and strain the liquor whilst

calentem; denique, consume eum, donec habeat
hot; lastly, evaporate it, until it acquire

idoneam crassitudinem.
a proper consistence.

This is an useless preparation, the virtues of sarsaparilla being destroyed by the formation of an insoluble extract.

EXTRACTUM STRAMONII.

EXTRACT OF THORN-APPLE.

Recipe libram Seminum Stramonii: congium
Take a pound of the Seeds of Thorn-Apple; a gallon

Aquæ ferventis;
of boiling Water;

Macera per horas quatuor in vase levitèr
Macerate for four hours in a vessel lightly

clauso prope ignem; dein exime Semina, et
covered near the fire; then take out the Seeds, and

contunde in mortario lapideo; redde
bruise (them) in a stone mortar; return

contusa liquori; tum decoque ad
the bruised (seeds) to the liquor; then boil down to

octarios quatuor, et cola liquorem adhuc calentem.
four pints, and strain the liquor whilst hot.

Denique, consume eum, donec habeat
Lastly, evaporate it, until it acquire

idoneam crassitudinem.
a proper consistence.

PROP.—Narcotic, stimulant.—DOSE, gr. ¼, gradually increased to gr. ij.

EXTRACTUM TARAXACI.

EXTRACT OF DANDELION.

Recipe libram Radicis recentis Taraxaci contusæ;
Take a pound of fresh Root of Dandelion bruised;

congium Aquæ ferventis;
a gallon of boiling Water;

Macera per horas viginti quatuor; tum decoque
Macerate for twenty-four hours; then boil down

ad octarios quatuor, et cola liquorem adhuc
to four pints, and strain the liquor whilst

calentem; denique, consume eum, donec habeat
hot; lastly, evaporate it, until it acquire

idoneam crassitudinem.
a proper consistence.

For properties, &c., see *Taraxacum*, page 71.—DOSE, gr. x. to ℈j.

MISTURÆ.

MIXTURES.

Mixtures should always be prepared when required to be used, as they are a class of preparations, which, in general, are soon disposed to undergo decomposition.

MISTURA AMMONIACI.

MIXTURE OF (GUM) AMMONIAC.

Recipe drachmas duas Ammoniaci;
Take two drams of Ammoniac;

octarium dimidium Aquæ;
half a pint of Water;

Tere Ammoniacum cum Aquâ paulatim
Rub the Ammoniac with the Water gradually

instillatâ, donec misceantur quàm optimè.
dropped in, until they are mixed as well as possible.

Prop.—Stimulating expectorant, and antispasmodic: useful in chronic catarrh, &c.—Dose, f ℥ss. to f ℥j.

MISTURA AMYGDALARUM.

MIXTURE OF ALMONDS.

Recipe uncias duas Confectionis Amygdalarum;
Take two ounces of the Confection of Almonds;

octarium Aquæ destillatæ;
a pint of distilled Water;

Adjice Aquam paulatim Confectioni
Add the Water gradually to the Confection

Amygdalarum inter terendum, donec misceantur;
of Almonds whilst triturating, until they are mixed;

dein cola.
then strain.

This demulcent mixture is an useful vehicle for a variety of medicines.

MISTURA ASSAFŒTIDÆ.

MIXTURE OF ASSAFŒTIDA.

Recipe drachmas duas Assafœtidæ;
Take two drams of Assafœtida;

octarium dimidium Aquæ;
half a pint of Water;

Tere Assafœtidam cum Aquâ instillatâ
Rub the Assafœtida with the Water dropped in

paulatim, donec misceantur quàm optimè.
gradually, until they are mixed as well as possible.

This is an useful form for exhibiting assafœtida by way of glyster in cases of cholic, worms, and the convulsions of infants arising from irritation in the bowels during the period of dentition.

MISTURA CAMPHORÆ.

MIXTURE OF CAMPHOR.

Recipe drachmam dimidiam Camphoræ; minima decem
Take half a dram of Camphor; ten minims

Spiritûs rectificati; octarium Aquæ;
of rectified Spirit; a pint of Water;

Tere Camphoram primùm cum Spiritu, deinde
Rub the Camphor first with the Spirit, then

cum Aquâ instillatâ paulatim, et cola.
with the Water dropped in gradually, and strain.

Camphor is only very slightly soluble in water. Pieces of camphor put into a bottle of water, and allowed to remain there some days, occasionally shaking, will produce all that can be effected by following the directions of the above formula: the solution may be poured off from time to time for use, and at the same time more water may be added to the undissolved camphor. By this means a supply of the solution may be kept up without any waste of camphor.

This is chiefly useful as a vehicle for medicines necessary to be administered in low fevers, nervous diseases, &c.

MISTURA CORNU USTI.

MIXTURE OF BURNT (HARTS') HORN.

Recipe uncias duas Cornuum ustorum; unciam
Take two ounces of burnt (Harts') Horns; an ounce

Gummi Acaciæ contriti; octarios tres
of the Gum of Acacia powdered; three pints

Aquæ;
of Water;

Decoque ad octarios duos, movens assiduè;
Boil down to two pints, stirring constantly;

tum cola.
then strain.

This is merely phosphate of lime suspended in water by means of mucilage, and is altogether useless.

MISTURA CRETÆ.

MIXTURE OF CHALK.

Recipe unciam dimidiam Cretæ præparatæ;
Take half an ounce of prepared Chalk;

drachmas tres Sacchari purificati; unciam dimidiam
three drams of purified Sugar; half an ounce

Gummi Acaciæ contriti octarium Aquæ.
of Gum of Acacia powdered; a pint of Water.

Misce.
Mix.

This is a convenient form for giving chalk, which has already been described as an useful medicine in diarrhœas, and other diseases arising from acidity of the *primæ viæ.* It may be advantageously combined with opium, catechu, &c.—DOSE, f℥j. to f℥ij.

MISTURA FERRI COMPOSITA.

COMPOUND MIXTURE OF IRON.

Recipe drachmam Myrrhæ contritæ;
Take a dram of Myrrh powdered;

grana viginti quinque Subcarbonatis Potassæ;
twenty-five grains of the Subcarbonate of Potash;

fluiduncias septem cum semisse Aquæ Rosæ;
seven fluid-ounces with half (an ounce) of Rose Water;

scrupulum Sulphatis Ferri contritæ;
a scruple of the Sulphate of Iron powdered;

fluidunciam dimidiam Spiritûs Myristicæ;
half a fluid-ounce of the Spirit of Nutmeg;

drachmam Sacchari purificati;
a dram of purified Sugar;

Tere simul Myrrham cum Spiritu Myristicæ
Rub together the Myrrh with the Spirit of Nutmeg

et Subcarbonate Potassæ, que his,
and the Subcarbonate of Potash, and to these,

inter terendum, adjice primùm Aquam Rosæ,
whilst triturating, add first the Water of the Rose,

cum Saccharo, deinde Sulphatem Ferri. Immitte
with the Sugar, then the Sulphate of Iron. Put

misturam statim in vas vitreum idoneum, que
the mixture immediately into a proper glass vessel, and

obtura id.
stop it.

The sulphate of iron and subcarbonate of potash are mutually decomposed, and *sulphate of potash*, and *proto-carbonate of iron* are formed. The former is in solution; the latter is in a solid state, mechanically suspended in the mixture by the myrrh. When properly prepared, this compound is of a green colour, but it becomes brown by exposure to the air, in consequence of the protoxide of iron absorbing oxygen, and becoming peroxide.

Prop.—The same as those of the other chalybeates.
Dose, f℥j. to f℥ij. every three or four hours.

MISTURA GUAIACI.

MIXTURE OF GUAIACUM.

Recipe drachmam cum semisse Gummi-resinæ
Take a dram with half (a dram) of the Gum-resin

Guaiaci; drachmas duas Sacchari purificati;
of Guaiacum; two drams of purified Sugar;

fluidrachmas duas Mucilaginis Gummi
two fluid-drams of the Mucilage of the Gum

Acaciæ; fluiduncias octo Aquæ
of Acacia; eight fluid-ounces of the Water

Cinnamomi;
of Cinnamon;

Tere Guaiacum cum Saccharo, deinde
Rub the Guaiacum with the Sugar, then

cum Mucilagine, que his, inter terendum,
with the Mucilage, and to these, whilst triturating,

adjice paulatim Aquam Cinnamomi.
add gradually the Water of Cinnamon.

This is an useful form for exhibiting guaiacum, the properties of which are mentioned at page 34. The action of the medicine is assisted by diluents.—DOSE, f℥ss. to f℥ij.

MISTURA MOSCHI.

MIXTURE OF MUSK.

Recipe Moschi, Gummi Acaciæ contriti,
Take of Musk, of the Gum of Acacia powdered,

Sacchari purificati, singulorum drachmam;
of purified Sugar, of each a dram;

Aquæ Rosæ fluiduncias sex;
of Rose Water six fluid-ounces;

Tere Moschum cum Saccharo, deinde cum Gummi,
Rub the Musk with the Sugar, then with the Gum,

Aquâ Rosæ instillatâ paulatim.
the Water of the Rose being dropped in gradually.

This is an elegant form for exhibiting musk, which is one of the most powerful of the antispasmodics.—DOSE, f℥ij. or more.

SPIRITUS.

SPIRITS.

ALCOHOL.

Recipe congium Spiritûs rectificati; libras tres
Take a gallon of rectified Spirit; three pounds

Subcarbonatis Potassæ;
of the Subcarbonate of Potash;

Injice libram Subcarbonatis Potassæ,
Throw in a pound of the Subcarbonate of Potash,

prius calefactam ad gradum trecentesimum,
first heated to the 300th degree,

Spiritui, et macera per horas viginti quatuor,
to the Spirit, and macerate for twenty-four hours,

movens sæpiùs; tum, effuso Spiritui, adjice
stirring frequently; then, to the Spirit poured off, add

Subcarbonatis Potassæ quod reliquum est,
of the Subcarbonate of Potash that which is left,

calefactum ad eundem gradum; denique,
heated to the same degree; lastly,

balneo aquoso, destillet Alcohol, quod
with a Water bath, let the Alcohol distil, which

est servandum in vase obturato.
is to be kept in a stopped vessel.

Pondus specificum Alcoholis est
The specific gravity of Alcohol is

ad pondus specificum Aquæ destillatæ, ut .815 ad
to the specific gravity of distilled Water, as .815 to

1.000 (octingentæ et quindecim ad mille).
1.000 (*eight hundred and fifteen to one thousand*).

Rectified spirit is alcohol in combination with water. By distilling it, as above, the water is removed, in consequence of its having a greater affinity for the subcarbonate of potash than for the alcohol, and consequently remaining in the retort while the latter passes over. By employing muriate of lime, which has a still greater affinity for water than subcarbonate of potash, alcohol may be obtained nearly pure.

Alcohol is composed of 2 atoms carbon, 1 atom oxygen, 3 atoms hydrogen. It boils at 176° F.* and is not capable of being frozen at the lowest known temperatures. It combines with water in all proportions with condensation of volume, and a consequent evolution of caloric. Amongst a variety of other substances, it dissolves the volatile oils, resins, gum-resins, soaps, sugar, extractive, and the alkalies.

For the generation of alcohol, see page 203, and for *rectified* and *proof spirit*, see page 67.

SPIRITUS AMMONIÆ.

SPIRIT OF AMMONIA.

Recipe octarios tres	Spiritûs tenuioris;		uncias quatuor
Take three pints	*of proof Spirit;*		*four ounces*
Muriatis		Ammoniæ;	uncias sex
of the Muriate		*of Ammonia;*	*six ounces*
Subcarbonatis	Potassæ;		
of the Subcarbonate	*of Potash;*		

---

* The boiling point of alcohol of course varies according to the quantity of water which it contains. It boils at the above point when of the sp. gr. stated by the College, viz. .815. By rectifying it over muriate of lime, it has been obtained as low as .791.

Misce,	et	destillet octarius cum semisse
Mix,	*and*	*let a pint and a half distil*
lento igne	in receptaculum	frigefactum.
with a slow fire	*into a receiver*	*made cool.*

Muriate of ammonia is composed of muriatic acid and ammonia; subcarbonate *(carbonate)* of potash, of carbonic acid and potash. Muriatic acid consists of chlorine and hydrogen, and potash of oxygen and potassium. The carbonic acid of the subcarbonate unites with the ammonia of the muriate, forming *carbonate of ammonia*, and the oxygen of the potash unites with the hydrogen of the muriatic acid, forming *water;* the potassium of the potash unites with the chlorine of the muriatic acid, and forms *chloride of potassium*, which remains in the retort.—Or, the muriatic acid of the muriate unites with the potash of the subcarbonate, forming *muriate of potash*, while the carbonic acid of the subcarbonate unites with the ammonia of the muriate, forming *carbonate of ammonia*, which is distilled over with the spirit.

In this case we obtain a *carbonate* of ammonia, consisting of 1 atom acid, and 1 atom ammonia, and not a *sesquicarbonate*, as when muriate of ammonia is decomposed in the dry way by carbonate of lime. See the note under *Ammoniæ Subcarb.* page 92.

This spirit is principally employed pharmaceutically.

Off. Prep. *Spiritus Ammoniæ Aromat.; Spiritus Ammoniæ fœtidus.*

SPIRITUS AMMONIÆ AROMATICUS.

AROMATIC SPIRIT OF AMMONIA.

Recipe	Corticis	Cinnamomi	contusi,
Take	*of the Bark*	*of Cinnamon*	*bruised,*

Caryophyllorum contusorum, singulorum
of Cloves bruised, of each

drachmas duas; uncias quatuor Corticis
two drams; four ounces of the Peel

Limonum; libram dimidiam Subcarbonatis
of Lemons; half a pound of the Subcarbonate

Potassæ; uncias quinque Muriatis
of Potash; five ounces of the Muriate

Ammoniæ; octarios quatuor Spiritûs rectificati;
of Ammonia; four pints of rectified Spirit;

congium Aquæ;
a gallon of Water;

Misce, et destillent octarii sex.
Mix, and let six pints distil.

PROP.—Stimulant, antispasmodic: employed in cases of fainting, flatulent colic, &c.—DOSE, fʒss. to fʒj. in water.

OFF. PREP.—*Tinctura Guaiaci ammoniata; Tinctura Valerianæ ammoniata.*

SPIRITUS AMMONIÆ FŒTIDUS.

FŒTID SPIRIT OF AMMONIA.

Recipe octarios duos Spiritûs Ammoniæ;
Take two pints of the Spirit of Ammonia;

uncias duas Assafœtidæ;
two ounces of Assafœtida;

Macera per horas duodecim, tum lento igne
Macerate for twelve hours, then with a slow fire

destillet octarius cum semisse in receptaculum
let a pint and a half distil into a receiver

frigefactum.
made cool.

Prop.—Stimulant, antispasmodic.—Dose, f℥ss. to f℥j. in water.

SPIRITUS AMMONIÆ SUCCINATUS.

SUCCINATED SPIRIT OF AMMONIA.

Recipe drachmas tres Mastiches; fluidrachmas novem
Take three drams of Mastich; nine fluid-drams

Spiritûs rectificati; minima quatuordecim Olei
of rectified Spirit; fourteen minims of the Oil

Lavandulæ; minima quatuor Olei Succini;
of Lavender; four minims of the Oil of Amber;

fluiduncias decem Liquoris Ammoniæ;
ten fluid-ounces of the solution of Ammonia;

Macera Mastichen in Spiritu, ut
Macerate the Mastich in the Spirit, that

liquetur, et effunde tincturam defæcatam;
it may be dissolved, and pour off the clear tincture;

tum adjice cætera, et agita omnia
then add the other (ingredients), and shake the whole

simul.
together.

Prop.—Stimulant, antispasmodic.—Dose, ♏x. to f℥ss. in any convenient vehicle.

SPIRITUS ANISI.

SPIRIT OF ANISEED.

Recipe libram dimidiam Seminum Anisi
Take half a pound of the Seeds of Anise

contusorum; congium Spiritûs tenuioris; quod
bruised; a gallon of proof Spirit; that which

sit satis Aquæ ad prohibendum
may be sufficient of Water to prevent

empyreuma;
empyreuma;

Macera per horas viginti quatuor; tum
Macerate for twenty-four hours; then

congius destillet lento igne.
let a gallon distil with a slow fire.

Prop.—Carminative, cordial.—Dose, fʒj. to fʒiv. in water.

SPIRITUS ARMORACIÆ COMPOSITUS.

COMPOUND SPIRIT OF HORSE-RADISH.

Recipe Radicis recentis Armoraciæ concisæ,
Take of the fresh Root of Horse-radish sliced,

Corticis exsiccati Aurantii, singulorum libram;
of the dried Peel of Orange, of each a pound;

Myristicæ Nucleorum contusorum unciam dimidiam;
of Nutmegs bruised half an ounce;

Spiritûs tenuioris congium; Aquæ quod
of proof Spirit a gallon; of Water that which

sit satis ad prohibendum empyreuma;
may be sufficient to prevent empyreuma;

Macera per horas viginti quatuor; tum
Macerate for twenty-four hours; then

destillet congius lento igne.
let a gallon distil with a slow fire.

This preparation of horse-radish is principally employed in dropsies as an adjuvant to other diuretics.—Dose, fʒj. to fʒiv.

SPIRITUS CAMPHORÆ.

SPIRIT OF CAMPHOR.

Recipe uncias quatuor Camphoræ; octarios duos
Take four ounces of Camphor; two pints

Spiritûs rectificati;
of rectified Spirit;

Misce, ut Camphora liquetur.
Mix, that the Camphor may be dissolved.

Spirit of camphor is employed as a local stimulant, either alone or with other remedies of a similar nature, in chilblains, numbness, gangrene, chronic rheumatism, &c.

SPIRITUS CARUI.

SPIRIT OF CARRAWAY.

Recipe Seminum Carui contusorum libram
Take of the Seeds of Carraway bruised a pound

cum semisse; Spiritûs tenuioris congium;
with half (a pound); of proof Spirit a gallon;

Aquæ quod sit satis ad prohibendum
of Water that which may be sufficient to prevent

empyreuma;
empyreuma;

Macera per horas viginti quatuor; tum
Macerate for twenty-four hours; then

destillet congius lento igne.
let a gallon distil with a slow fire.

Prop.—Carminative, stimulant, stomachic. It is sometimes used to correct the unpleasant griping of some purgatives.—Dose, f℥j. to f℥iv.

SPIRITUS CINNAMOMI.

SPIRIT OF CINNAMON.

Recipe	scrupulos quinque,	pondere,	Olei
Take	*five scruples,*	*by weight,*	*of the Oil*
Cinnamomi;	octarios quatuor	cum semisse	
of Cinnamon;	*four pints*	*with half (a pint)*	
Spiritûs rectificati;			
of rectified Spirit;			

Adjice	Spiritum	Oleo,	et	affunde
Add	*the Spirit*	*to the Oil,*	*and*	*pour thereto*
tantum	Aquæ,	ut	post destillationem	
so much	*Water,*	*that*	*after distillation*	
supersit	quod	sit	satis	
there may remain	*that which*	*may be*	*sufficient*	
ad prohibendum	empyreuma;	tum	lento igne	
to prevent	*empyreuma;*	*then*	*with a slow fire*	
destillet congius.				
let a gallon distil.				

PROP.—Stimulant, aromatic.—DOSE, fʒj. to fʒiv. in any convenient liquid.

SPIRITUS COLCHICI AMMONIATUS.

AMMONIATED SPIRIT OF MEADOW-SAFFRON.

Recipe	uncias duas	Seminum	Colchici
Take	*two ounces*	*of the Seeds*	*of Meadow-saffron*
contusorum;	octarium	Spiritûs aromatici	
bruised;	*a pint*	*of the Aromatic Spirit*	
Ammoniæ;			
of Ammonia;			

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

This is not an eligible form for the exhibition of colchicum.—Dose, f℥ss. to f℥j. in any proper vehicle.

SPIRITUS JUNIPERI COMPOSITUS.

COMPOUND SPIRIT OF JUNIPER.

Recipe Baccarum Juniperi contusarum libram;
Take of the Berries of Juniper bruised a pound;

Seminum Carui contusorum, Seminum
of the Seeds of Carraway bruised, of the Seeds

Fœniculi contusorum, singulorum unciam
of Fennel bruised, of each an ounce

cum semisse; Spiritûs tenuioris congium;
with half (an ounce); of proof Spirit a gallon;

Aquæ quod sit satis ad prohibendum
of Water that which may be sufficient to prevent

empyreuma;
empyreuma;

Macera per horas viginti quatuor; tum
Macerate for twenty-four hours; then

destillet congius lento igne.
let a gallon distil with a slow fire.

This spirit may be used in conjunction with other diuretic remedies in dropsies.—Dose, f℥j. to f℥iv.

SPIRITUS LAVANDULÆ.

SPIRIT OF LAVENDER.

Recipe libras duas Florum recentium Lavandulæ;
Take two pounds of the fresh flowers of Lavender;

congium Spiritûs rectificati ; quod sit
a gallon of rectified Spirit ; that which may be

satis Aquæ ad prohibendum empyreuma;
sufficient of Water to prevent empyreuma;

Macera per horas viginti quatuor; tum
Macerate for twenty-four hours ; then

destillet congius lento igne.
let a gallon distil with a slow fire.

Principally employed as a perfume.

SPIRITUS LAVANDULÆ COMPOSITUS.

COMPOUND SPIRIT OF LAVENDER.

Recipe Spiritûs Lavandulæ octarios tres;
Take of the Spirit of Lavender three pints;

Spiritûs Rosmarini octarium; Corticis
of the Spirit of Rosemary a pint; of the Bark

Cinnamomi contusi, Myristicæ Nucleorum
of Cinnamon bruised, of Nutmegs

contusorum, singulorum unciam dimidiam;
bruised, of each half an ounce;

Pterocarpi Ligni concisi unciam;
of red Saunders Wood sliced an ounce;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Prop.—Stimulant.—Dose, ♏xxx. to f℥ij., on a lump of sugar, or in water.

SPIRITUS MENTHÆ PIPERITÆ.

SPIRIT OF PEPPERMINT.

Recipe pondere scrupulos sex cum semisse
Take by weight six scruples with half (a scruple)

Olei Menthæ piperitæ; octarios quatuor
of the Oil of Peppermint; four pints

cum semisse Spiritûs rectificati;
with half (a pint) of rectified Spirit;

Adjice Spiritum Oleo, et affunde tantum
Add the Spirit to the Oil, and pour thereto so much

Aquæ, ut supersit post destillationem
Water, that there may remain after distillation

quod sit satis ad prohibendum
that which may be sufficient to prevent

empyreuma; tum lento igne destillet congius.
empyreuma; then with a slow fire let a gallon distil.

Prop.—Carminative, antispasmodic.—Dose, f ʒj. to f ℥ss.

SPIRITUS MENTHÆ VIRIDIS.

SPIRIT OF SPEARMINT.

Recipe pondere scrupulos sex cum semisse
Take by weight six scruples with half (a scruple)

Olei Menthæ viridis; octarios quatuor
of the Oil of Spearmint; four pints

cum semisse Spiritûs rectificati;
with half (a pint) of rectified Spirit;

Adjice Spiritum Oleo, et affunde tantum
Add the Spirit to the Oil, and pour thereto so much

Aquæ, ut post destillationem supersit
Water, that after distillation there may remain

quod sit satis ad prohibendum
that which may be sufficient to prevent

empyreuma; tum lento igne destillet congius.
empyreuma; then with a slow fire let a gallon distil.

Prop.—Carminative, stomachic.—Dose, fʒj. to f℥ss.

SPIRITUS MYRISTICÆ.

SPIRIT OF NUTMEG.

Recipe Myristicæ Nucleorum contusorum uncias duas;
Take of Nutmegs bruised two ounces;

Spiritûs tenuioris congium; Aquæ quod
of proof Spirit a gallon; of Water that which

sit satis ad prohibendum empyreuma;
may be sufficient to prevent empyreuma;

Macera per horas viginti quatuor; tum
Macerate for twenty-four hours; then

destillet congius lento igne.
let a gallon distil with a slow fire.

Prop.—Stimulant, carminative.—Dose, fʒj to f℥ss.

SPIRITUS PIMENTÆ.

SPIRIT OF PIMENTA.

Recipe Baccarum Pimentæ contusarum
Take of the Berries of Pimenta bruised

uncias duas; Spiritûs tenuioris congium; Aquæ
two ounces; of proof Spirit a gallon; of Water

quod sit satis ad prohibendum
that which may be sufficient to prevent

empyreuma;
empyreuma;

Macera per horas viginti quatuor; tum
Macerate for twenty-four hours; then

lento igne destillet congius.
with a slow fire let a gallon distil.

PROP.—Carminative.—DOSE, f℈j. to f℥ss.

SPIRITUS PULEGII.

SPIRIT OF PENNYROYAL.

Recipe scrupulos septem, pondere, Olei
Take seven scruples, by weight, of Oil

Pulegii; octarios quatuor cum semisse
of Pennyroyal; four pints with half (a pint)

Spiritûs rectificati;
of rectified Spirit;

Adjice Spiritum Oleo, et affunde tantum
Add the Spirit to the Oil, and pour thereto so much

Aquæ, ut post destillationem supersit
Water, that after distillation there may remain

quod sit satis ad prohibendum
that which may be sufficient to prevent

empyreuma; tum lento igne destillet congius.
empyreuma; then with a slow fire let a gallon distil.

PROP.—Carminative.—DOSE, f℈j. to f℥ss.

SPIRITUS ROSMARINI.

SPIRIT OF ROSEMARY.

Recipe unciam pondere Olei Rosmarini;
Take an ounce by weight of the Oil of Rosemary;

congium Spiritûs rectificati;
a gallon of rectified Spirit;

Adjice Spiritum Oleo, et affunde tantum
Add the Spirit to the Oil, and pour thereto so much

Aquæ, ut post destillationem supersit
Water, that after distillation there may remain

quod sit satis ad prohibendum
that which may be sufficient to prevent

empyreuma; tum lento igne destillet congius.
empyreuma; then with a slow fire let a gallon distil.

PROP.—Stimulant.—DOSE, f ʒj. to f ℥ss.
OFF. PREP.—*Linimentum Saponis C.; Spiritus Lavandulæ C.*

TINCTURÆ.

TINCTURES.

Tinctures are solutions of vegetable or animal substances in rectified or proof spirit.

TINCTURÆ omnes debent præparari
All Tinctures ought to be prepared

in vasis vitreis clausis, et agitari sæpiùs
in glass vessels closed, and to be shaken often

inter macerandum.
whilst macerating.

TINCTURA ALOES.

TINCTURE OF ALOES.

Recipe Extracti Aloës spicatæ contriti
Take of Extract of spiked Aloes powdered

unciam dimidiam; Extracti Glycyrrhizæ unciam
half an ounce; of Extract of Liquorice an ounce

cum semisse; Aquæ octarium;
with half (an ounce); of Water a pint;

Spiritûs rectificati fluiduncias quatuor;
of rectified Spirit four fluid-ounces;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

The spirit in this preparation is of no other use than to prevent decomposition. For properties, &c. see *Alöes*, page 11.—Dose, f℥ss. to f℥iss.

TINCTURA ALOES COMPOSITA.

COMPOUND TINCTURE OF ALOES.

Recipe Extracti Aloës spicatæ contriti,
Take of Extract of spiked Aloes powdered,

Stigmatum Croci, singulorum uncias tres;
of Stigmata of Saffron, of each three ounces;

Tincturæ Myrrhæ octarios duos;
of Tincture of Myrrh two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Prop.—This tincture is a warm stomachic, and cathartic, useful in chlorosis, jaundice, gout, &c.—Dose, as a stomachic, fʒj. to fʒij.; as a cathartic, f℥ss. to f℥iss.

TINCTURA ASSAFŒTIDÆ.

TINCTURE OF ASSAFŒTIDA.

Recipe uncias quatuor Assafœtidæ; octarios duos
Take four ounces of Assafœtida; two pints

Spiritûs rectificati;
of rectified Spirit;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

For properties, see *Assafœtida*, page 16.—Dose, fʒss. to fʒj. or more.

TINCTURA AURANTII.

TINCTURE OF ORANGE (PEEL).

Recipe Corticis recentis Aurantii uncias tres;
Take of fresh Peel of Orange three ounces;

Spiritûs tenuioris octarios duos;
of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

This tincture is merely of use to flavour infusions, decoctions, &c.—The Dose may be from fʒss. to f℥ss.

TINCTURA BENZOINI COMPOSITA.

COMPOUND TINCTURE OF BENJAMIN.

Recipe uncias tres Benzöini; uncias duas Balsami
Take three ounces of Benzoin; two ounces of Balsam

Styracis colati; unciam Balsami Tolutani;
of Storax strained; an ounce of Balsam of Tolu;

unciam dimidiam Extracti Aloës spicatæ;
half an ounce of Extract of spiked Aloes;

octarios duos Spiritûs rectificati;
two pints of rectified Spirit;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Prop.—Stimulating expectorant. Given in chronic catarrh, &c. It is also employed externally as a stimulant to indolent ulcers.—Dose, fʒss. to fʒij. formed into an emulsion with water by means of mucilage, or yolk of egg.

TINCTURA CALUMBÆ.

TINCTURE OF CALUMBA.

Recipe uncias duas cum semisse Calumbæ
Take two ounces with half (an ounce) of Calumba

concisæ; octarios duos Spiritûs tenuioris;
sliced; two pints of proof Spirit;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

For properties, &c., see *Calumba*, page 18. This tincture is added to tonic infusions and decoctions for improving their qualities.—The Dose may be from fʒss. to f℥ss.

TINCTURA CAMPHORÆ COMPOSITA.

COMPOUND TINCTURE OF CAMPHOR.

Recipe Camphoræ scrupulos duos; duri Opii
Take of Camphor two scruples; of hard Opium

contriti, Acidi Benzöici, singulorum drachmam;
powdered, of Benzoic Acid, of each a dram;

Spiritûs tenuioris octarios duos;
of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

One grain of opium is contained in about f℥ss of this tincture.

PROP.—Anodyne, It is used in chronic catarrh, &c. DOSE, f℥j. to f℥ij.

TINCTURA CANTHARIDIS.

TINCTURE OF SPANISH FLY.

Recipe drachmas tres Cantharidis contusæ;
Take three drams of Spanish Fly bruised;

octarios duos Spiritûs tenuioris;
two pints of proof Spirit;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

For properties of *Cantharis*, see page 19.—DOSE, ♏x. to f℥j. in any demulcent vehicle.

TINCTURA CAPSICI.

TINCTURE OF CAPSICUM.

Recipe unciam Baccarum Capsici;
Take an ounce of the Berries of Capsicum;

octarios duos Spiritûs tenuioris;
two pints of proof Spirit;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Prop.—Stimulant, aromatic. Useful in cynanche maligna, in the low stages of typhus, &c. A gargle that may be advantageously employed in cynanche maligna, is formed by adding fʒij. of this tincture to f℥viij. of infusion of roses.—Dose, ♏. xij. to fʒss.

TINCTURA CARDAMOMI.

TINCTURE OF CARDAMOM.

Recipe uncias tres Seminum Cardamomi
Take three ounces of the Seeds of Cardamom

contusorum; octarios duos Spiritûs tenuioris;
bruised; two pints of proof Spirit;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Employed as an adjunct to infusions and other forms of medicine, in Doses of fʒj. to f℥ss. or more.

TINCTURA CARDAMOMI COMPOSITA.

COMPOUND TINCTURE OF CARDAMOM.

Recipe Seminum Cardamomi, Seminum
Take of the Seeds of Cardamom, the Seeds

Carui, Cocci, singulorum
of Carraway, (and) Cochineal, of each

contritorum drachmas duas; Corticis Cinnamomi
bruised two drams; of Bark of Cinnamon

contusi unciam dimidiam; Uvarum passarum,
bruised half an ounce; of dried Grapes (Raisins),

acinis demptis, uncias quatuor;
the stones being taken out, four ounces;

Spiritûs tenuioris octarios duos;
of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Employed like the former, and in the same doses.

TINCTURA CASCARILLÆ.

TINCTURE OF CASCARILLA.

Recipe Corticis Cascarillæ contriti uncias quatuor;
Take of Bark of Cascarilla powdered four ounces;

Spiritûs tenuioris octarios duos;
of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

For properties, &c., see *Cascarilla*, page 21.—Dose. fʒss. to f℥ss. Seldom employed.

TINCTURA CASTOREI.

TINCTURE OF CASTOR.

Recipe uncias duas Castorei contriti;
Take two ounces of Castor powdered;

octarios duos Spiritûs rectificati;
two pints of rectified Spirit;

Macera per dies septem, et cola.
Macerate for seven days, and strain.

The active properties of castor reside in resin and a volatile oil, which are soluble in the spirit.

Prop.—Antispasmodic, emmenagogue.—Dose, fʒss. to f℥ss.

TINCTURA CATECHU.

TINCTURE OF CATECHU.

Recipe	uncias tres	Extracti	Catechu ;
Take	*three ounces*	*of the Extract*	*of Catechu ;*
uncias duas	Corticis	Cinnamomi	contusi ;
two ounces	*of the Bark*	*of Cinnamon*	*bruised ;*
octarios duos	Spiritûs tenuioris ;		
two pints	*of proof Spirit ;*		
Macera	per dies quatuordecim,	et cola.	
Macerate	*for fourteen days,*	*and strain.*	

Prop.—This tincture is a warm astringent, useful in chronic diarrhœas.—Dose, fʒj. to fʒiij. in any proper vehicle.

TINCTURA CINCHONÆ.

TINCTURE OF CINCHONA (BARK).

Recipe	Corticis	Cinchonæ lancifoliæ	contriti
Take	*of the Bark*	*of lance-leaved Cinchona*	*powdered*
uncias septem ;	Spiritûs tenuioris	octarios duos ;	
seven ounces ;	*of proof Spirit*	*two pints ;*	
Macera	per dies quatuordecim,	et cola.	
Macerate	*for fourteen days,*	*and strain.*	

Used principally as an adjunct to the infusion or decoction, in Doses of fʒj. to f℥ss. It cannot be given in a sufficient dose to fulfil all the intentions of bark or sulphate of quina, on account of the spirit which it contains.

TINCTURA CINCHONÆ AMMONIATA.

AMMONIATED TINCTURE OF CINCHONA (BARK).

Recipe Corticis Cinchonæ lancifoliæ contriti
Take of the Bark of lance-leaved Cinchona powdered

uncias quatuor; Spiritûs aromatici Ammoniæ
four ounces; of aromatic Spirit of Ammonia

octarios duos;
two pints;

Macera per dies decem, et cola.
Macerate for ten days, and strain.

Used in the same manner, and in the same doses as the former.

TINCTURA CINCHONÆ COMPOSITA.

COMPOUND TINCTURE OF CINCHONA (BARK).

Recipe Corticis Cinchonæ lancifoliæ contriti
Take of the Bark of lance-leaved Cinchona powdered

uncias duas; Corticis Aurantii exsiccati
two ounces; of the Peel of Orange dried

unciam cum semisse; Radicis Serpentariæ contusæ
an ounce and a half; of Root of Serpentary bruised

drachmas tres; Stigmatum Croci drachmam;
three drams; of the Stigmata of Saffron a dram;

Cocci contriti scrupulos duos;
of Cochineal powdered two scruples;

Spiritûs tenuioris fluiduncias viginti;
of proof Spirit twenty fluid-ounces;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Used in the same manner, and in the same doses as the former two.

TINCTURA CINNAMOMI.

TINCTURE OF CINNAMON.

Recipe Corticis Cinnamomi contusi uncias tres;
Take of Bark of Cinnamon bruised three ounces;

Spiritûs tenuioris octarios duos;
of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Used as an adjunct to a variety of other medicines, in Doses of fʒj. to f ʒiij.

TINCTURA CINNAMOMI COMPOSITA.

COMPOUND TINCTURE OF CINNAMON.

Recipe Corticis Cinnamomi contusi drachmas sex;
Take of Bark of Cinnamon bruised six drams;

Seminum Cardamomi contusorum drachmas tres;
of the Seeds of Cardamom bruised three drams;

Fructûs Piperis longi contriti, Radicis
of the Fruit of long Pepper powdered, of the Root

Zingiberis concisæ, singulorum drachmas duas;
of Ginger sliced, of each two drams;

Spiritûs tenuioris octarios duos;
of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Used as an adjunct to other medicines. It may also be given in flatulent complaints, atonic gout, &c.—Dose, fʒj. to fʒij. or more in any convenient liquid.

TINCTURA DIGITALIS.

TINCTURE OF DIGITALIS.

Recipe	Foliorum	Digitalis	exsiccatorum
Take	*of the Leaves*	*of the Foxglove*	*dried*
uncias quatuor;	Spiritûs tenuioris	octarios duos;	
four ounces;	*of proof Spirit*	*two pints;*	
Macera	per dies quatuordecim,	et cola.	
Macerate	*for fourteen days,*	*and strain.*	

♏x. of this tincture are about equal to gr. j. of digitalis in powder.

This is an useful preparation, as the virtues of digitalis may be long preserved under the form of tincture. For properties, &c., see page 29.—Dose, ♏x., cautiously increased.

TINCTURA GENTIANÆ COMPOSITA.

COMPOUND TINCTURE OF GENTIAN.

Recipe	Radicis	Gentianæ	concisæ	uncias duas;
Take	*of the Root*	*of Gentian*	*sliced*	*two ounces;*
Corticis	Aurantii	exsiccati	unciam;	
of the Peel	*of Orange*	*dried*	*an ounce;*	
Seminum	Cardamomi	contusorum		
of the Seeds	*of Cardamom*	*bruised*		
unciam dimidiam;	Spiritûs tenuioris	octarios duos;		
half an ounce;	*of proof Spirit*	*two pints;*		
Macera	per dies quatuordecim,	et cola.		
Macerate	*for fourteen days,*	*and strain.*		

Prop.—Stomachic. This is an useful adjunct to other medicines in dyspepsia, &c.—Dose, fʒj. to fʒij.

TINCTURA GUAIACI.

TINCTURE OF GUAIACUM.

Recipe	Gummi-resinæ	Guaiaci	contritæ
Take	*of the Gum-resin*	*of Guaiacum*	*powdered*
libram dimidiam;	Spiritûs rectificati	octarios duos;	
half a pound;	*of rectified Spirit*	*two pints:*	
Macera	per dies quatuordecim,	et cola.	
Macerate	*for fourteen days,*	*and strain.*	

For Prop. &c., see *Guaiacum*, page 34.—Dose, fʒj. to fʒij., formed into an emulsion with water by means of mucilage, or yolk of egg.

TINCTURA GUAIACI AMMONIATA.

AMMONIATED TINCTURE OF GUAIACUM.

Recipe	Gummi-resinæ	Guaiaci	contritæ
Take	*of the Gum-resin*	*of Guaiacum*	*powdered*
uncias quatuor;	Spiritûs aromatici	Ammoniæ	
four ounces;	*of aromatic Spirit*	*of Ammonia*	
octarium cum semisse;			
a pint and a half;			
Macera	per dies quatuordecim,	et cola.	
Macerate	*for fourteen days,*	*and strain.*	

The Guaiacum is assisted in its operation by the ammonia; this tincture is therefore preferable to the former.—Dose, fʒj. to fʒij., in form of emulsion.

TINCTURA HELLEBORI NIGRI.

TINCTURE OF BLACK HELLEBORE.

Recipe Radicis Hellebori nigri concisæ
Take of the Root of black Hellebore sliced

uncias quatuor; Spiritûs tenuioris octarios duos;
four ounces; of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

This preparation of hellebore is chiefly employed as an emmenagogue.—Dose, fʒss. to fʒj., in any convenient liquid.

TINCTURA HUMULI.

TINCTURE OF HOP.

Recipe Strobilorum Humuli uncias quinque;
Take of the Strobiles of the Hop five ounces;

Spiritûs tenuioris octarios duos;
of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Prop.—Tonic, diuretic, anodyne, sedative. It is recommended as being useful in some cases where opium is not admissible.—Dose, fʒss. to fʒij., or upwards.

TINCTURA HYOSCYAMI.

TINCTURE OF HENBANE.

Recipe Foliorum Hyoscyami exsiccatorum
Take of the Leaves of Henbane dried

uncias quatuor; Spiritûs tenuioris octarios duos;
four ounces; of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

For properties, &c. of *Henbane*, see page 37.—Dose, ♏x. to fʒj. In the larger dose it seldom fails to procure sleep.

TINCTURA JALAPÆ.

TINCTURE OF JALAP.

Recipe Radicis Jalapæ contritæ uncias octo;
Take of the Root of Jalap powdered eight ounces;

Spiritûs tenuioris octarios duos;
of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

This tincture is sometimes used as an adjunct to other cathartics in form of mixture.—Dose, fʒj. to fʒiv.

TINCTURA KINO.

TINCTURE OF KINO.

Recipe Kino contriti uncias tres;
Take of Kino powdered three ounces;

Spiritûs rectificati octarios duos;
of rectified Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Astringent. Employed with other astringents in form of mixture in chronic diarrhœa, &c.—Dose, fʒj. to fʒij.

TINCTURA MYRRHÆ.

TINCTURE OF MYRRH.

Recipe	Myrrhæ	contusæ	uncias quatuor;
Take	*of Myrrh*	*bruised*	*four ounces;*

Spiritûs rectificati octarios tres;
of rectified Spirit three pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Myrrh, under this form, is principally employed locally in gargles along with infusion of roses, &c. It is also applied to unhealthy ulcers, and to bones whilst undergoing the exfoliating process, and, when diluted with water, it is an useful application for spongy gums.

TINCTURA OPII.

TINCTURE OF OPIUM.

Recipe	Opii duri	contriti	uncias duas
Take	*of hard Opium*	*powdered*	*two ounces*

cum semisse; Spiritûs tenuioris octarios duos;
and a half; of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

♏xix. of this tincture contain gr. j. of opium. It is an useful form for exhibiting opium, especially when its immediate action on the system is required.—Dose, ♏x. to fʒj.; but in some cases larger doses are often necessary. In tetanus, patients are capable of bearing extraordinary doses of opium. fʒj., given previous to aperients in colica pictonum, is said to pave the way for their successful operation. Externally applied it is anodyne. Its action in this way is facilitated by uniting it with vinegar; but the alkalies and their carbonates destroy its effects: in the former case acetate of morphia, which is soluble, is formed; in the latter case, the morphia is precipitated, yet how often we see it prescribed in liniments, in which ammonia is one of the ingredients.

TINCTURA RHEI.

TINCTURE OF RHUBARB.

Recipe Radicis Rhei concisæ uncias duas;
Take of the Root of Rhubarb sliced two ounces;

Seminum Cardamomi contusorum unciam dimidiam;
of Seeds of Cardamom bruised half an ounce;

Stigmatum Croci drachmas duas;
of the Stigmata of Saffron two drams;

Spiritûs tenuioris octarios duos;
of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Prop.—Stomachic in small, and aperient in large doses.—Dose, as a stomachic, f ʒj. to f ʒiij.; as an aperient, f ℥j. It is generally used as an adjunct to other stomachics, or saline aperients.

TINCTURA RHEI COMPOSITA.

COMPOUND TINCTURE OF RHUBARB.

Recipe Radicis Rhei concisæ uncias duas;
Take of the Root of Rhubarb sliced two ounces;

Radicis Glycyrrhizæ contusæ unciam dimidiam;
of Root of Liquorice bruised half an ounce;

Radicis Zingiberis concisæ, Stigmatum
of the Root of Ginger sliced, of the Stigmata

Croci,	singulorum	drachmas duas ;
of Saffron,	*of each*	*two drams ;*

Spiritûs tenuioris	octarium ;	Aquæ
of proof Spirit	*a pint ;*	*of Water*

fluiduncias duodecim ;
twelve fluid-ounces ;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Prop. and Dose, the same as the former ; but it is a more grateful medicine.

TINCTURA SCILLÆ.

TINCTURE OF SQUILL.

Recipe	Radicis	Scillæ	recèns exsiccatæ
Take	*of the Root*	*of Squill*	*newly dried*

uncias quatuor ;	Spiritûs tenuioris	octarios duos ;
four ounces ;	*of proof Spirit*	*two pints ;*

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

This is an useful form for the exhibition of *squill*, the properties of which are described at page 63.—Dose, ♏x. to f℥ss., in the mixture of ammoniacum, &c.

TINCTURA SENNÆ.

TINCTURE OF SENNA.

Recipe	Foliorum	Sennæ	uncias tres ;	Seminum
Take	*of the Leaves*	*of Senna*	*three ounces ;*	*of Seeds*

Carui	contusorum	drachmas tres ;	Seminum
of Carraway	*bruised*	*three drams ;*	*of Seeds*

Cardamomi contusorum drachmam;
of Cardamom bruised a dram;

Uvarum passarum, acinis demptis,
of dried Grapes (Raisins), the stones being taken out,

uncias quatuor; Spiritûs tenuioris octarios duos;
four ounces; of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Prop.—Stomachic and aperient.—Dose, f ʒij. to f ℥j.

TINCTURA SERPENTARIÆ.

TINCTURE OF SERPENTARY.

Recipe Radicis Serpentariæ uncias tres;
Take of the Root of Serpentary three ounces;

Spiritûs tenuioris octarios duos;
of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

This tincture may be advantageously added to the infusion or decoction of cinchona, in typhus, &c.—Dose, f ʒss. to f ʒij.

TINCTURA VALERIANÆ.

TINCTURE OF VALERIAN.

Recipe Radicis Valerianæ uncias quatuor,
Take of the Root of Valerian four ounces,

Spiritûs tenuioris octarios duos;
of proof Spirit two pints;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

This is not a good form for exhibiting valerian, as the dose required to be effective is too large for so nauseous a medicine.

TINCTURA VALERIANÆ AMMONIATA.

AMMONIATED TINCTURE OF VALERIAN.

Recipe	Radicis	Valerianæ	uncias quatuor ;
Take	*of the Root*	*of Valerian*	*four ounces ;*

Spiritûs aromatici Ammoniæ octarios duos;
of aromatic Spirit of Ammonia two pints ;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

On account of the ammonia, this tincture is much stronger in medical efficacy than the former. It is employed in hysteria, &c.—Dose, fʒj. to fʒij., in any bland fluid.

TINCTURA ZINGIBERIS.

TINCTURE OF GINGER.

Recipe	Radicis	Zingiberis	concisæ	uncias duas;
Take	*of the Root*	*of Ginger*	*sliced*	*two ounces ;*

Spiritûs rectificati octarios duos;
of rectified Spirit two pints ;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Prop.—Stimulant, carminative. Employed in gouty attacks of the stomach, &c., and as an adjunct to purgatives which are griping in their operation.—Dose, fʒss. to fʒij.

ÆTHEREA.

PREPARATIONS OF ÆTHER.

Æthers are a class of compounds which result from the action of some of the acids upon alcohol. The æther always takes its name from the acid employed: thus, sulphuric acid and alcohol produce *sulphuric æther;* muriatic acid and alcohol, *muriatic æther;* acetic acid and alcohol, *acetic æther*, &c.

ÆTHER SULPHURICUS.

SULPHURIC ÆTHER.

Recipe Spiritûs rectificati, Acidi sulphurici,
Take of rectified Spirit, (and) of sulphuric Acid,

singulorum, pondere, libram cum semisse.
of each, by weight, a pound and a half.

Infunde Spiritum retortæ vitreæ, que adjice
Pour the Spirit into a glass retort, and add

Acidum ei paulatim, sæpiùs agitans, et
the Acid to it gradually, frequently shaking (it), and

cavens ne calor excedat
taking care lest the heat should exceed

gradum centesimum vigesimum, donec misceantur.
the hundred and twentieth degree, until they are mixed.

Dein impone cautè in arenam, priùs
Then place (them) cautiously in sand, first

calefactam ad gradum ducentesimum, ut liquor
heated to the two hundredth degree, that the liquor

ebulliat quàm celerrimè, que Æther
may boil as quickly as possible, and the Æther

transeat in receptaculum tubulatum, cui
pass over into a tubulated receiver, to which

vas recipiens sit aptatum, refrigeratum
a receiving vessel should be fitted, cooled

glacie vel aquâ. Destillet liquor, donec
with ice or with water. Let the liquor distil, until

pars aliqua gravior incipiat transire, quæ
some heavier part shall begin to pass over, which

conspiciatur sub Æthere in fundo
may be seen under the Æther at the bottom

receptaculi. Liquori qui restat
of the receiver. To the liquor which remains

in retortâ rursus affunde uncias duodecim
in the retort again pour twelve ounces

Spiritûs rectificati, ut Æther destillet
of rectified Spirit, that the Æther may distil

simili modo.
in a similar manner.

The formation of sulphuric æther appears to be owing to the sulphuric acid abstracting 1 atom of water, or its elements, from alcohol. Alcohol and æther are constituted as follows:

Alcohol.

2 atoms carbon..........	$6 \times 2 =$	12
1 atom oxygen..........	$=$	8
3 atoms hydrogen	$1 \times 3 =$	3
		23

Æther.

4 atoms carbon..........	$6 \times 4 =$	24
1 atom oxygen..........	$=$	8
5 atoms hydrogen	$1 \times 5 =$	5
		37

If, therefore, 1 atom of oxygen and 1 atom of hydrogen be abstracted from 2 atoms of alcohol, the remaining elements will be in the exact proportions to form æther.

At the commencement of the process alcohol passes over, next æther, and, if the heat be continued, water, sulphurous acid, a yellowish liquid called *ethereal oil*, or *oil of wine*, and olefiant gas. By the *heavier part*, the College means the sulphurous acid in solution in water.

OFF. PREP.—*Spiritus Ætheris aromaticus.*

ÆTHER RECTIFICATUS.

RECTIFIED ÆTHER.

Recipe fluiduncias quatuordecim Ætheris sulphurici;
Take fourteen fluid-ounces of sulphuric Æther;

unciam dimidiam Potassæ fusæ; undecim
half an ounce of fused Potash; eleven

fluiduncias Aquæ destillatæ;
fluid-ounces of distilled water;

Primùm liqua Potassam in fluidunciis duabus
First dissolve the Potash in two fluid-ounces

Aquæ, que adjice Ætherem ei, agitans
of the Water, and add the Æther to it, shaking (them)

assiduè, donec misceantur; tum, calore
constantly, until they become mixed; then, with a heat

gradûs circiter centesimi vigesimi, destillent
of about the hundred and twentieth degree, let there distil

fluiduncicæ duodecim Ætheris ex retortâ amplâ
twelve fluid-ounces of Æther from a large retort

in vas refrigeratum; agita destillatum simul
into a cooled vessel; shake the distilled (portion) together

cum fluidunciis novem Aquæ, et
with nine fluid-ounces of the water, and

sepone ut Aqua subsidat. Denique,
set (them) aside that the Water may subside. Lastly,

effunde Ætherem rectificatum supernatantem,
pour off the supernatant rectified Æther,

et serva vase bene obturato.
and keep (it) in a vessel well stopped.

The directions for the two preparations, *æther sulphuricus* and *æther rectificatus*, might have been comprised in one formula, the latter being only a continuation of the former process; besides, as sulphuric æther is not fit for the purposes of medicine until it has been rectified, it is unnecessary to keep it as a distinct preparation.

Sulphuric æther, when first distilled, contains alcohol, water, and sulphurous acid, and the potassa fusa is used for removing these: it is dissolved by the water and alcohol, but being insoluble in pure æther, that fluid is readily separated from the alkaline solution. The sulphurous acid unites with a portion of the potash.

The sp. gr. of æther varies according to its purity. As met with in the shops, it is generally of about .733, but it has been obtained as low as .700. It boils at 96° or 98° F., and freezes at 46° below Zero. It will combine with alcohol in any proportion; but it is only very slightly dissolved by water, the greater portion of it separating from that fluid if the mixture be allowed to stand after agitation. It dissolves ammonia; but not the fixed alkalies. It also dissolves essential oils, resins, and some of the vegetable alkalies.

Prop.—Stimulant, antispasmodic, narcotic. As a stimulant, it resembles alcohol; but its effects are more powerful, diffusible, and transient. When applied externally, and prevented from evaporating by covering it over on the part to which it is applied, it acts as a stimulant, and is employed for relieving a variety of pains; but when evaporation is suffered to take place, it then produces a great degree of cold, in consequence of its extreme volatility: it will be found useful, when applied in the latter way, as a refrigerant in cases of burns, and other inflammations. It may also be used with advantage as an evaporant in apoplexy, phrenitis, strangulated hernia, &c., and were it less expensive, the practitioner would not be so niggard of its use.—Dose, ♏xx. to fʒij.

Off. Prep.—*Spiritus Ætheris sulphurici.*

OLEUM ÆTHEREUM.

ÆTHEREAL OIL.

Post destillationem Ætheris sulphurici
After the distillation of sulphuric Æther

destillet liquor iterum, lenito calore, donec
let the liquor distil again, with a gentle heat, until

spuma nigra intumescat; tum protinùs remove
a black froth swells up; then immediately remove

retortam ab igne. Liquori qui restat
the retort from the fire. To the liquor which remains

in retorta, adjice Aquam, ut pars oleosa
in the retort, add water, that the oily part

supernatet. Aufer hanc, que admisce ei
may swim. Take off this, and mix to it

quantum sit satis Liquoris
as much as may be sufficient of the solution

Calcis ad saturandum Acidum quod
of Lime (Lime-water) to saturate the Acid which

inest, et agita simul. Denique
is present, and shake (them) together. Lastly,

exime oleum æthereum separatum.
take off the separated ethereal oil.

This preparation is impure æthereal oil, or *oil of wine*. It is only used pharmaceutically in preparing *Spiritus Ætheris Sulphurici C.*

SPIRITUS ÆTHERIS AROMATICUS.

AROMATIC SPIRIT OF ÆTHER.

Recipe drachmas tres Corticis Cinnamomi contusi;
Take three drams of Bark of Cinnamon bruised;

drachmam cum semisse Seminum Cardamomi
a dram and a half of Seeds of Cardamom

contritorum; Fructûs Piperis longi contriti,
powdered; of Fruit of long Pepper powdered,

Radicis Zingiberis concisæ, singulorum drachmam;
of Root of Ginger sliced, of each a dram;

Spiritûs Ætheris sulphurici octarium;
of Spirit of sulphuric Æther a pint;

Macera per dies quatuordecim in vase vitreo
Macerate for fourteen days in a glass vessel

obturato, et cola.
stopped, and strain.

Prop.—Stimulant. Seldom employed.—Dose, fʒss. to fʒij.

SPIRITUS ÆTHERIS NITRICI.

NITRIC SPIRIT OF ÆTHER.

Recipe Spiritûs rectificati octarios duos; Acidi nitrici,
Take of rectified Spirit two pints; of nitric Acid,

pondere, uncias tres;
by weight, three ounces;

Adjice Acidum Spiritui paulatim, et misce,
Add the Acid to the Spirit gradually, and mix,

cavens ne calor excedat
taking care lest the heat should exceed

gradum centesimum vigesimum; tum, leni calore,
the hundred and twentieth degree; then, with a gentle heat,

destillent fluidunciæ viginti quatuor.
let twenty-four fluid-ounces distil.

Nitric æther is procured by distilling a mixture of equal parts, by weight, of strong nitric acid and alcohol. It requires a great deal of caution in conducting the process, on account of the energetic action of the two liquids upon each other. There is some difference of opinion amongst chemists, respecting the nature of the change which gives rise to the compound in question. The alcohol and nitric acid appear to be mutually decomposed, as the resulting nitric æther is found to consist of carbon, oxygen, hydrogen, and nitrogen. Pure nitric æther is more volatile than sulphuric æther. The above preparation is a solution of nitric æther in alcohol.

Prop.—Diuretic, antispasmodic, refrigerant. It may be advantageously combined with other medicines possessing similar properties.—Dose, ♏xx. to f ʒj.

SPIRITUS ÆTHERIS SULPHURICI.

SPIRIT OF SULPHURIC ÆTHER.

Recipe Ætheris rectificati octarium dimidium;
Take of rectified Æther half a pint;

Spiritûs rectificati octarium;
of rectified Spirit a pint;

Misce.
Mix.

Prop.—The same as those of æther; but, of course, much less powerful.—Dose, f ʒj. to f ʒiij.

SPIRITUS ÆTHERIS SULPHURICI COMPOSITUS.

COMPOUND SPIRIT OF SULPHURIC ÆTHER.

Recipe Spiritûs Ætheris sulphurici octarium;
Take of the Spirit of sulphuric Æther a pint;

Olei Ætherei fluidrachmas duas;
of Æthereal Oil two fluid-drams;

Misce.
Mix.

Prop.—Stimulant, antispasmodic, anodyne.—Dose, f ʒss. to f ʒij.

VINA.

WINES.

This class of preparations was formerly made by employing wine as a solvent of the vegetable principles; but as wine is liable to vary in strength, and to undergo spontaneous decomposition, dilute spirit is now substituted in its place.

VINUM ALOES.

WINE OF ALOES.

Recipe Extracti Aloës spicatæ uncias octo;
Take of Extract of spiked Aloes eight ounces;

Corticis Canellæ uncias duas; Spiritûs tenuioris,
of Bark of Canella two ounces; of proof Spirit,

Aquæ destillatæ, singulorum octarios quatuor;
(and) of distilled water, of each four pints;

Tere Aloën in pulverem cum arenâ albâ,
Rub the Aloes into a powder with white sand,

purgatâ sordibus; etiam tere Corticem
cleansed from impurities; also rub the Bark

Canellæ in pulverem; que his, mistis inter se,
of Canella into a powder; and to these, mixed together,

affunde Spiritum et Aquam. Macera
pour the Spirit and the Water. Macerate

per dies quatuordecim, subindè movens, et cola.
for fourteen days, frequently shaking, and strain.

The sand is ordered for the purpose of assisting the pulverization of the aloes, and is separated from the solution by straining. The Canella bark corrects the griping qualities of the aloes.

PROP.—Stomachic, in doses of f ʒj. to f ʒij.; in doses of f ℥j. to f ℥ij., it acts as a warm cathartic.

VINUM COLCHICI.

WINE OF MEADOW SAFFRON.

Recipe libram Radicis recentis Colchici
Take a pound of fresh Root of Meadow Saffron

concisæ; fluiduncias quatuor Spiritûs tenuioris;
sliced; four fluid-ounces of proof Spirit;

fluiduncias octo Aquæ destillatæ;
eight fluid-ounces of distilled Water;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

This preparation is liable to vary in strength, in consequence of the recent bulb of colchicum always containing a considerable portion of water, the quantity of which varies according to the dry or moist nature of the soil in which the plant grows. The water of the bulb, in a fresh state, dilutes the spirit too much to admit of a sufficient quantity of veratria being taken up, that alkali being only very slightly soluble in water. The bulb dried, when taken up at the proper season of the year, (see *Colchicum autumnale*, page 25,) might be substituted. Sherry wine would be a better solvent of veratria than dilute spirit, on account of the excess of tartaric acid of the supertartrate of potash, and acetic acid which it contains.*

Prop.—Notwithstanding what has been just said, this preparation possesses all the virtues of colchicum, but liable to vary in strength.—Dose, ♏xx. to f℥iss. in some bitter infusion. It is said that magnesia prevents the nausea sometimes occurring from the exhibition of colchicum.

VINUM IPECACUANHÆ.

WINE OF IPECACUANHA.

Recipe Radicis Ipecacuanhæ contusæ
Take of the Root of Ipecacuanha bruised

uncias duas; Spiritûs tenuioris fluiduncias duodecim;
two ounces; of proof Spirit twelve fluid-ounces;

Aquæ destillatæ fluiduncias viginti;
of distilled Water twenty fluid-ounces;

Macera per dies quatuordecim, et cola.
Macerate for fourteen days, and strain.

Prop.—Expectorant, diaphoretic, in doses of ♏x. to ♏xx. In large doses emetic. It is an useful emetic for infants, to which a tea-spoonful may be given every ten minutes until it operates.

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* As the seeds of colchicum possess the medicinal properties of the root, they may also be employed. Dr. A. T. Thomsom gives the following formula for a wine from the seeds: digest *two ounces* of the unbruised seeds in *two pints* of sherry wine for eight days.

VINUM OPII.

WINE OF OPIUM.

Recipe Extracti Opii unciam; Corticis
Take of the Extract of Opium an ounce; of the Bark

Cinnamomi contusi, Caryophyllorum contusorum,
of Cinnamon bruised, of Cloves bruised,

singulorum drachmam; Spiritûs tenuioris
of each a dram; of proof Spirit

fluiduncias sex; Aquæ destillatæ fluiduncias decem.
six fluid-ounces; of distilled Water ten fluid-ounces.

Macera per dies octo, et cola.
Macerate for eight days, and strain.

The aromatics which enter into this preparation are intended to correct the unpleasant action of opium on the brain and nervous system.—Dose, ♏x. to f℥j. This preparation, made with wine, was first recommended by Mr. Ware as a local application in the second stage of ophthalmia, after inflammation has subsided, and the vessels of the conjunctiva remain turgid with blood. Two or three drops are to be poured in the eye every morning until the redness be removed.

VINUM VERATRI.

WINE OF (WHITE) HELLEBORE.

Recipe Radicis Veratri concisæ
Take of the Root of (white) Hellebore sliced

uncias octo; Spiritûs tenuioris octarium;
eight ounces; of proof Spirit a pint;

Aquæ destillatæ octarium cum semisse;
of distilled Water a pint and a half;

Macera per dies quartuordecim, et cola.
Macerate for fourteen days, and strain.

As *veratria* is the active principle of this preparation, it may be given in the same cases as the wine of colchicum, but it is scarcely ever employed.—Dose, ♏x. to f℥ss.

ACETICA.

PREPARATIONS OF VINEGAR.

Vinegar is a good solvent of the active principle of the bulbs employed in the two following preparations. These, however, are deteriorated when long kept, on account of the disposition which the vinegar has to undergo a change, notwithstanding the employment of the spirit.

ACETUM COLCHICI.

VINEGAR OF MEADOW-SAFFRON.

Recipe Radicis recentis Colchici concisæ unciam;
Take of the fresh Root of Colchicum sliced an ounce;

Acidi acetici diluti octarium; Spiritûs tenuioris
of dilute acetic Acid a pint; of proof Spirit

fluidunciam;
a fluid-ounce;

Macera Radicem Colchici cum Acido
Macerate the Root of Colchicum with the Acid

in vase vitreo clauso, per dies tres; dein exprime,
in a glass vessel closed, for three days; then express,

et sepone, ut fæces subsidant; denique,
and set aside, that the dregs may subside; lastly,

adjice Spiritum liquori defæcato.
add the Spirit to the cleared liquor.

The virtues of colchicum, and the active principle on which they depend, have been already described. For reasons stated under *Vinum colchici*, the dried is preferable to the recent bulb, and may be employed in the proportion of six drams to the pint of vinegar.—Dose, f℥ss. to f℥j. in any bland fluid.

ACETUM SCILLÆ.

VINEGAR OF SQUILL.

Recipe Radicis Scillæ recèns exsiccatæ libram;
Take of the Root of Squill fresh dried a pound;

Acidi acetici diluti octarios sex; Spiritûs tenuioris
of dilute acetic Acid six pints; of proof Spirit

octarium dimidium;
half a pint;

Macera Radicem Scillæ cum Acido,
Macerate the Root of Squill with the Acid,

leni calore, in vase vitreo clauso,
with a gentle heat, in a glass vessel closed,

per horas viginti quatuor; dein exprime, et sepone,
for twenty-four hours; then express, and set aside,

ut fæces subsidant; denique,
that the dregs may subside; lastly,

adjice Spiritum liquori defæcato.
add the Spirit to the cleared liquor.

Given as an expectorant in chronic catarrh, humoral asthmas, and as a diuretic in dropsies.—Dose, f℥ss.

to f℥ij. in peppermint-water, &c. In large doses it may be employed as an emetic.

OFF. PREP.—*Oxymel Scillæ.*

MELLITA.

PREPARATIONS OF HONEY.

Preparations of honey have an advantage over syrups in not being so prone to decomposition.

MEL DESPUMATUM.

CLARIFIED HONEY.

Liqua Mel in balneo aquoso; tum aufer
Dissolve the Honey in a Water bath; then take off

spumam.
the scum.

Honey, thus deprived of wax and other impurities, is principally employed in forming the OFF. PREP. *Confectio Rutæ; Linimentum Æruginis;* and the four following preparations.

MEL BORACIS.

HONEY OF BORAX.

Recipe Subboratis Sodæ contritæ drachmam;
Take of the Subborate of Soda powdered a dram;

Mellis despumati unciam;
of Honey clarified an ounce;

Misce.
Mix.

This is an useful detergent application in aphthous affections of the mouth; and may be employed in solution in water as a gargle in salivations.

MEL ROSÆ.

HONEY OF THE ROSE.

Recipe	Petalorum	Rosæ Gallicæ
Take	*of the Petals*	*of the French Rose* (*red rose*)
exsiccatorum	uncias quatuor;	Aquæ ferventis
dried	*four ounces;*	*of boiling Water*
octarios tres;	Mellis despumati	libras quinque;
three pints;	*of Honey clarified*	*five pounds;*

Macera	Petala	Rosæ	in Aquâ
Macerate	*the Petals*	*of the Rose*	*in the Water*
per horas sex;	deinde	adjice	Mel
for six hours;	*then*	*add*	*the Honey*
liquori colato,	et	decoque	balneo aquoso
to the strained liquor,	*and*	*boil down*	*in a water bath*
ad idoneam crassitudinem.			
to a proper consistence.			

This is slightly astringent, and may be used with other astringents in forming gargles.

OXYMEL SIMPLEX.

SIMPLE OXYMEL.

Recipe	Mellis	despumati	libras duas;
Take	*of Honey*	*clarified*	*two pounds;*
Acidi acetici diluti	octarium;		
of diluted acetic Acid	*a pint;*		

Decoque in vase vitreo, lento igne,
Boil down in a glass vessel, with a slow fire,

ad idoneam crassitudinem.
to a proper consistence.

Chiefly employed as a vehicle for other remedies in catarrh, and as an adjunct to gargles.

OXYMEL SCILLÆ.

OXYMEL OF SQUILL.

Recipe Mellis despumati libras tres; Aceti
Take of Honey clarified three pounds; of Vinegar

Scillæ octarios duos;
of Squill two pints;

Decoque in vase vitreo, lento igne,
Boil down in a glass vessel, with a slow fire,

ad idoneam crassitudinem.
to a proper consistence.

This may be given as an expectorant in chronic catarrh and humoral asthma, in doses of f ʒss. to f ʒij. In larger doses, it may be employed as an emetic in hooping cough.

SYRUPI.

SYRUPS.

Syrups are principally employed to flavour or give colour to other medicines. They very soon spoil by keeping, especially when badly prepared, or exposed to a warm temperature.

Syrupi conserventur in loco ubi calor
Syrups should be kept in a place where the heat

nunquam excedat gradum quinquagesimum quintum.
never exceeds the fifty-fifth degree.

SYRUPUS ALTHÆÆ.

SYRUP OF MARSHMALLOW.

Recipe Radicis recentis Althææ contusæ
Take of the fresh Root of Marshmallow bruised

libram dimidiam; Sacchari purificati libras duas;
half a pound; of purified Sugar two pounds;

Aquæ octarios quatuor;
of Water four pints;

Decoque Aquam cum Radice ad dimidium,
Boil down the Water with the Root to half,

et exprime liquorem frigefactum. Sepone
and express the cooled liquor. Set aside

per horas viginti quatuor, ut fæces subsidant;
for twenty-four hours, that the dregs may subside;

tum effunde liquorem, atque, adjecto Saccharo,
then pour off the liquor, and, the Sugar being added,

decoque ad idoneam crassitudinem.
boil down to a proper consistence.

SYRUPUS AURANTIORUM.

SYRUP (OF THE PEEL) OF ORANGES.

Recipe Corticis recentis Aurantiorum uncias duas;
Take of fresh Peel of Oranges two ounces;

Aquæ ferventis octarium; Sacchari purificati
of boiling Water a pint; of purified Sugar

libras tres;
three pounds;

Macera Corticem in Aquâ per horas duodecim,
Macerate the Peel in the Water for twelve hours,

in vase levitèr clauso; tum effunde liquorem,
in a vessel lightly covered; then pour off the liquor,

que adjice Saccharum ei.
and add the Sugar to it.

SYRUPUS CROCI.

SYRUP OF SAFFRON.

Recipe Stigmatum Croci unciam;
Take of Stigmata of Saffron an ounce;

Aquæ ferventis octarium; Sacchari purificati
of boiling Water a pint; of purified Sugar

libras duas cum semisse;
two pounds and a half;

Macera Stigmata Croci in Aqua
Macerate the Stigmata of Saffron in the Water

per horas duodecim, in vase levitèr clauso;
for twelve hours, in a vessel lightly covered;

dein cola liquorem, et adjice Saccharum.
then strain the liquor, and add the Sugar.

SYRUPUS LIMONUM.

SYRUP OF LEMONS.

Recipe Succi Limonum colati octarium;
Take of the Juice of Lemons strained a pint;

Sacchari purificati libras duas;
of purified Sugar two pounds;

Liqua Saccharum in Succo Limonum
Dissolve the Sugar in the Juice of Lemons

eodem modo quo præceptum est de
in the same manner in which it is directed concerning

Syrupo simplici.
simple Syrup.

This may be used for forming acidulated drinks in febrile diseases.

SYRUPUS MORI.

SYRUP OF MULBERRY.

Recipe Succi Mori colati octarium;
Take of the Juice of Mulberry strained a pint;

Sacchari purificati libras duas;
of purified Sugar two pounds;

Liqua Saccharum in Succo Mori,
Dissolve the Sugar in the Juice of Mulberry,

eodem modo quo præceptum est de
in the same manner in which it is directed concerning

Syrupo simplici.
simple Syrup.

This may be used like the former, and also as a colouring ingredient.

SYRUPUS PAPAVERIS.

SYRUP OF (WHITE) POPPY.

Recipe Capsularum Papaveris, exsiccatarum
Take of the Capsules of (white) Poppy, dried

et contusarum, demptis seminibus,
and bruised, the seeds being taken away,

uncias quatuordecim ; Sacchari purificati libras duas ;
fourteen ounces ; of purified Sugar two pounds ;

Aquæ ferventis congios duos cum semisse ;
of boiling Water two gallons and a half ;

Macera Capsulas in Aquâ
Macerate the Capsules in the Water

per horas viginti quatuor ; tum decoque
for twenty-four hours ; then boil down

balneo aquoso ad congium, et exprime fortitèr.
in a water bath to a gallon, and express strongly.

Decoque Liquorem colatum iterum ad octarios duos,
Boil down the strained Liquor again to two pints,

et cola adhuc ferventem. Sepone
and strain whilst hot. Set aside

per horas duodecim, ut fæces subsidant ;
for twelve hours, that the dregs may subside ;

tum decoque liquorem defæcatum ad octarium, et
then boil down the cleared liquor to a pint, and

adjice Saccharum, eodem modo quo
add the Sugar, in the same manner in which

præceptum est de Syrupo simplici.
it is ordered concerning simple Syrup.

This syrup very soon spoils by keeping. One fluid-ounce contains about one grain of extract of poppy. It is an useful anodyne for children in doses of f℥ss. to f℥j. when in a good state of preservation.

SYRUPUS RHAMNI.

SYRUP OF BUCKTHORN.

Recipe Succi recentis Baccarum Rhamni
Take of the fresh Juice of the Berries of Buckthorn

octarios quatuor; Radicis Zingiberis concisæ,
four pints; of Root of Ginger sliced,

Baccarum Pimentæ contritarum, singulorum
of the Berries of Pimenta powdered, of each

unciam dimidiam; Sacchari purificati libras tres
half an ounce; of purified Sugar three pounds

cum semisse;
and a half;

Sepone Succum per triduum, ut fæces
Set aside the Juice for three days, that the dregs

subsidant, et cola. Adjice Radicem Zingiberis
may subside, and strain. Add the Root of Ginger

et Baccas Pimentæ octario Succi
and the Berries of Pimenta to a pint of the Juice

defæcati; tum macera leni calore per
strained; then macerate with a gentle heat for

horas quatuor, et cola; quod est reliquum
four hours, and strain; that which is left

decoque ad mensuram octarii cum semisse; misce
boil down to the measure of a pint and a half; mix

liquores; et adjice Saccharum eodem modo
the liquors; and add the Sugar in the same manner

quo præceptum est de Syrupo simplici.
in which it is ordered concerning simple Syrup.

This syrup operates freely as a cathartic, but, on account of the unpleasantness of its action, it is not often employed.—Dose, f℥ss. to f℥j.

SYRUPUS RHŒADOS.

SYRUP OF THE RED POPPY.

Recipe Petalorum recentium Rhœados libram;
Take of the fresh Petals of the red Poppy a pound;

Aquæ ferventis octarium cum fluidunciis duabus;
of boiling Water a pint with two fluid ounces ;

Sacchari purificati libras duas cum semisse;
of purified Sugar two pounds and a half ;

Adjice Petala Rhœados paulatim
Add the Petals of the red Poppy gradually

Aquæ, calefactæ balneo aquoso, movens
to the Water, heated in a water bath, stirring

subindè ; tum, vase remoto, macera
frequently ; then, the vessel being removed, macerate

per horas duodecim ; dein exprime liquorem, et
for twelve hours ; then express the liquor, and

sepone, ut fæces subsidant ; denique, adjice
set aside, that the dregs may subside ; lastly, add

Saccharum, eodem modo quo præceptum est
the Sugar, in the same manner in which it is ordered

de Syrupo simplici.
concerning simple Syrup.

SYRUPUS ROSÆ.

SYRUP OF THE ROSE.

Recipe Petalorum Rosæ centifoliæ
Take of the Petals of the hundred leaved Rose

exsiccatorum uncias septem; Sacchari purificati
dried seven ounces ; of purified Sugar

libras sex ; Aquæ ferventis octarios quatuor;
six pounds ; of boiling Water four pints ;

Macera Petala Rosæ in Aqua
Macerate the Petals of the Rose in the Water

per horas duodecim, et cola. Consume
for twelve hours, and strain. Evaporate

liquorem colatum balneo aquoso ad octarios duos
the strained liquor in a water bath to two pints

cum semisse ; dein adjice Saccharum, eodem modo
and a half; then add the Sugar, in the same manner

quo preceptum est de Syrupo simplici.
in which it is ordered concerning simple Syrup.

Employed as a mild aperient for infants, in doses of f ʒij. or more.

SYRUPUS SARSAPARILLÆ.

SYRUP OF SARSAPARILLA.

Recipe libram Radicis Sarsaparillæ concisæ;
Take a pound of the Root of Sarsaparilla sliced;

congium Aquæ ferventis; libram
a gallon of boiling Water; a pound

Sacchari purificati;
of purified Sugar;

Macera Radicem in Aquâ
Macerate the Root in the Water

per horas viginti quatuor; tum decoque
for twenty-four hours; then boil down

ad octarios quatuor, et cola liquorem adhuc
to four pints, and strain the liquor whilst

calentem; dein adjice Saccharum, et consume
hot; then add the Sugar, and evaporate

ad idoneam crassitudinem.
to a proper consistence.

Altogether useless.

SYRUPUS SENNÆ.

SYRUP OF SENNA.

Recipe Foliorum Sennæ uncias duas; Seminum
Take of the Leaves of Senna two ounces; of Seeds

Fœniculi contusorum unciam; Mannæ
of Fennel bruised an ounce; of Manna

uncias tres; Sacchari purificati libram;
three ounces; of purified Sugar a pound;

Aquæ ferventis octarium;
of boiling Water a pint;

Macera Folia Sennæ et Semina Fœniculi
Macerate the Leaves of Senna and the Seeds of Fennel

in Aquâ, leni calore, per horam. Cola
in the Water, with a gentle heat, for an hour. Strain

liquorem, et misce cum hoc Mannam et Saccharum;
the liquor, and mix with this the Manna and the Sugar;

dein decoque ad idoneam crassitudinem.
then boil down to a proper consistence.

Chiefly employed as an aperient for children in doses of f ℨj. or more.

SYRUPUS SIMPLEX.

SIMPLE SYRUP.

Recipe Sacchari purificati libras duas cum semisse;
Take of purified Sugar two pounds and a half;

Aquæ octarium;
of Water a pint;

Liqua Saccharum in Aquâ balneo aquoso;
Dissolve the Sugar in the Water in a water bath;

tum sepone per horas viginti quatuor; dein aufer
then set aside for twenty-four hours; then take off

spumam, et effunde liquorem purum à fæcibus,
the scum, and pour off the pure liquor from the dregs,

si sint quæ.
if there be any.

SYRUPUS TOLUTANUS.

SYRUP OF TOLU.

Recipe Balsami Tolutani unciam; Aquæ ferventis
Take of the Balsam of Tolu an ounce; of boiling Water

octarium; Sacchari purificati libras duas;
a pint; of purified Sugar two pounds;

Coque Balsamum in Aquâ per horam dimidiam
Boil the Balsam in the Water for half an hour

in vase clauso, movens subinde, et cola
in a covered vessel, stirring frequently, and strain

liquorem refrigeratum; dein adjice Saccharum,
the cooled liquor; then add the Sugar,

eodem modo quo præceptum est de
in the same manner in which it is ordered concerning

Syrupo simplici.
simple Syrup.

SYRUPUS ZINGIBERIS.

SYRUP OF GINGER.

Recipe Radicis Zingiberis concisæ uncias duas;
Take of the Root of Ginger sliced two ounces;

Aquæ ferventis octarium; Sacchari purificati
of boiling Water a pint; of purified Sugar

libras duas;
two pounds;

Macera Radicem Zingiberis in Aquâ
Macerate the Root of Ginger in the Water

per horas quatuor, et cola; dein adjice Saccharum,
for four hours, and strain; then add the Sugar,

eodem modo quo præceptum est de
in the same manner in which it is ordered concerning

Syrupo simplici.
simple Syrup.

This syrup is slightly stimulant, and may be employed as an adjunct to bitter infusions.

CONFECTIONES.

CONFECTIONS.

This form of preparation, with few exceptions, is employed as a vehicle for more active remedies.

Si Confectiones, servatæ diu, indurescant,
If Confectiones, kept long, should grow hard,

sunt humectandæ Aquâ, ut
they are to be moistened with Water, that

idonea crassitudo restituatur.
a proper consistence may be restored.

CONFECTIO AMYGDALARUM.

CONFECTION OF ALMONDS.

Recipe Amygdalarum dulcium unciam;
Take of sweet Almonds an ounce;*

Gummi Acaciæ contriti drachmam;
of Gum of Acacia powdered a dram;

Sacchari purificati unciam dimidiam;
of purified Sugar half an ounce;

Amygdalis priùs maceratis in Aqua,
The Almonds first being macerated in the Water,

que pelliculis demptis,
and the pellicles (or outer skins) being taken away,

contunde omnia simul, donec sit corpus unum.
bruise the whole together, until there be one body.

This is kept for the purpose of making the *Mistura amygdalæ*, which see.

CONFECTIO AROMATICA.

AROMATIC CONFECTION.

Recipe Corticis Cinnamomi, Myristicæ Nucleorum,
Take of Bark of Cinnamon, (and) of Nutmegs,

singulorum, uncias duas; Caryophyllorum unciam;
of each, two ounces; of Cloves an ounce;

Seminum Cardamomi unciam dimidiam;
of Seeds of Cardamom half an ounce;

Stigmatum Croci exsiccatorum uncias duas;
of the Stigmata of Saffron dried two ounces;

---

* Or *bitter Almonds.*

Testarum præparatarum uncias sedecim;
of prepared hells sixteen ounces;

Sacchari purificati contriti libras duas; Aquæ
of purified Sugar powdered two pounds; of Water

octarium;
a pint;

Tere arida simul in pulverem sub-
Rub the dried (ingredients) together into a very fine

tilissimum; tum adjice Aquam paulatim, et misce,
powder; then add the Water gradually, and mix,

donec sit corpus unum.
until there be one body.

Prop.—Stimulant, astringent, cordial.
It is employed in low fevers, nervous debility, diarrhœas, &c.—Dose, gr. x. to ℨj. or more.

CONFECTIO AURANTIORUM.

CONFECTION OF ORANGES.

Recipe Corticis exterioris recentis Aurantiorum,
Take of the fresh outer rind of Oranges,

separati radulâ libram;
separated with a grater (i. e. grated) a pound;

Sacchari purificati libras tres;
of purified Sugar three pounds;

Contunde Corticem, in mortario lapideo,
Bruise the Rind, in a stone mortar,

pistillo ligneo; tum, adjecto Saccharo,
with a wooden pestle; then, the Sugar being added,

contunde iterum, donec sit corpus unum.
bruise again, until there be one body.

Prop.—Tonic, stomachic. Chiefly used as a vehicle for more active tonics.

CONFECTIO CASSIÆ.

CONFECTION OF CASSIA.

Recipe Pulpæ recentis Cassiæ libram dimidiam;
Take of the fresh Pulp of Cassia half a pound;

Mannæ uncias duas; Pulpæ Tamarindi
of Manna two ounces; of the Pulp of the Tamarind

unciam; Syrupi Rosæ octarium dimidium;
an ounce; of Syrup of the Rose half a pint;

Contunde Mannam; tum, balneo aquoso,
Bruise the Manna; then, with a water bath,

liqua in Syrupo; deinde admisce
dissolve (it) in the Syrup; then mix therewith

pulpas, et consume humorem, donec
the pulps, and evaporate the moisture, until

idonea crassitudo fiat.
a proper consistence be formed.

Prop.—Mildly laxative.—Dose, ʒj. to ℥j.

CONFECTIO OPII.

CONFECTION OF OPIUM.

Recipe Opii duri contriti drachmas sex;
Take of hard Opium powdered six drams;

Fructûs Piperis longi unciam; Radicis
of the Fruit of long Pepper an ounce; of Root

Zingiberis uncias duas; Seminum Carui
of Ginger two ounces; of the Seeds of Carraway

uncias tres ; Tragacanthæ contritæ drachmas duas;
three ounces ; of Tragacanth powdered two drams ;

Syrupi octarium.
of Syrup a pint.

Contere Opium cum Syrupo calefacto; tum
Triturate the Opium with the heated Syrup ; then

adjice cætera contrita, et misce.
add the other (ingredients) powdered, and mix

Prop.—Stimulant, carminative, anodyne. Employed in diarrhœas, and colic, arising from flatulence.—Dose, gr. x. to ℈ss. It should be remembered that thirty-six grains of this confection contain about one grain of opium.

CONFECTIO PIPERIS NIGRI.

CONFECTION OF BLACK PEPPER.

Recipe Piperis nigri ; Radicis Helenii,
Take of black pepper ; of the Root of Elecampane,

singulorum libram ; Seminum Fœniculi
of each a pound ; of the Seeds of Fennel

libras tres ; Mellis, Sacchari purificati,
three pounds ; of Honey, (and) of purified Sugar,

singulorum libras duas ;
of each two pounds ;

Tere arida simul
Rub the dry (ingredients) together

in pulverem subtilissimum ; dein, adjecto Melle,
into a very fine powder ; then, the Honey being added,

contunde, donec sit corpus unum.
pound (them) together, until there be one body.

This preparation resembles *Ward's paste* for the piles, respecting which Dr. Paris observes that " it is principally useful in those cases attended with considerable debility, in leucophlegmatic habits, and when piles arise from a deficient secretion in the rectum. On the other hand, the composition will as certainly prove injurious in those cases which are accompanied with erysipelatous inflammation, and which require cooling laxatives, and a total abstinence from all stimulants for their cure."—Dose, ʒj. to ʒij. or more.

CONFECTIO ROSÆ CANINÆ.

CONFECTION OF THE DOG ROSE.

Recipe	Pulpæ	Rosæ caninæ	libram;
Take	*of the Pulp*	*of the dog Rose*	*a pound;*

Sacchari purificati	contriti	uncias viginti;	
of purified Sugar	*powdered*	*twenty ounces;*	

Expone	Pulpam	in balneo aquoso,	leni calore;
Expose	*the Pulp*	*in a water bath,*	*in a gentle heat;*

tum	adjice	Saccharum	paulatim,	et tere	simul
then	*add*	*the Sugar*	*gradually,*	*and rub*	*together*

donec	sit	corpus unum.
until	*there be*	*one body.*

This is principally employed for forming a variety of active medicines into pills.

CONFECTIO ROSÆ GALLICÆ.*

CONFECTION OF THE RED ROSE.

Recipe	Petalorum	Rosæ Gallicæ	nondum
Take	*of the Petals*	*of the red Rose*	*not yet*

* Rosa Gallica, *French Rose.*

explicatorum, abjectis unguibus,
unfolded (i. e. *the buds*), *the claws being rejected,*

libram; Sacchari purificati libras tres;
a pound; of purified Sugar three pounds;

Contunde Petala in mortario lapideo; tum,
Bruise the Petals in a stone mortar; then,

adjecto Saccharo, contunde iterum donec
the Sugar being added, bruise (*them*) *again until*

sit corpus unum.
there be one body.

Employed as the preceding.

CONFECTIO RUTÆ.

CONFECTION OF RUE.

Recipe Foliorum Rutæ exsiccatorum, Seminum
Take of the Leaves of Rue dried, of Seeds

Carui, Baccarum Lauri, singulorum
of Carraway, of the Berries of Bay, of each

unciam cum semisse; Sagapeni unciam dimidiam;
an ounce and a half; of Sagapenum half an ounce;

Fructûs Piperis nigri drachmas duas;
of the Fruit of black Pepper two drams;

Mellis despumati uncias sedecim;
of Honey clarified sixteen ounces;

Tere arida simul
Rub the dry (*ingredients*) *together*

in pulverem subtilissimum; tum, adjecto Melle,
into a very fine powder; then, the Honey being added,

misce omnia.
mix the whole (*together*).

This confection, in the proportion of ℈j. to ʒj. or more in Oss. of gruel, is said to form an useful antispasmodic enema for infants troubled with flatulent colic or convulsions.

CONFECTIO SCAMMONEÆ.

CONFECTION OF SCAMMONY.

Recipe Gummi-resinæ Scammoneæ contritæ
Take of the Gum-resin of Scammony powdered

unciam cum semisse; Caryophyllorum contusorum,
an ounce and a half; of Cloves bruised,

Radicis Zingiberis contritæ, singulorum
(and) of the Root of Ginger powdered, of each

drachmas sex; Olei Carui fluidrachmam
six drams; of Oil of Carraway half a fluid-

dimidiam; Syrupi Rosæ quantum sit
dram; of Syrup of the Rose as much as may be

satis;
sufficient;

Tere arida simul in pulverem sub-
Rub the dry (ingredients) together into a very fine

tilissimum; tum, instillato Syrupo, tere
powder; then, the Syrup being dropped in, rub (them)

iterum; dein, Oleo Carui adjecto,
again; afterwards, the Oil of Carraway being added,

misce omnia.
mix the whole (together).

PROP.—Stimulating cathartic.—DOSE, ʒss. to ʒj.

CONFECTIO SENNÆ.

CONFECTION OF SENNA.

Recipe Foliorum Sennæ uncias octo;
Take of the Leaves of Senna eight ounces;

Fructûs Caricæ libram; Pulpæ
of the Fruit of the Fig a pound; of the Pulp

Tamarindi, Pulpæ Cassiæ, Pulpæ
of the Tamarind, of the Pulp of Cassia, (and) of the Pulp

Prunorum, singulorum libram dimidiam; Seminum
of Prunes, of each half a pound; of Seeds

Coriandri uncias quatuor; Radicis
of Coriander four ounces; of the Root

Glycyrrhizæ uncias tres; Sacchari purificati
of Liquorice three ounces; of purified Sugar

libras duas cum semisse.
two pounds and a half.

Tere Folia Sennæ cum Seminibus
Rub the Leaves of Senna with the Seeds

Coriandri, et separa uncias decem
of Coriander, and separate ten ounces

pulveris misti cribro. Decoque residuum
of the mixed powder with a sieve. Boil down the residue

cum Fructû Caricæ et Radice Glycyrrhizæ
with the Fruit of the Fig and the Root of Liquorice

ex octariis quatuor Aquæ ad dimidium; deinde
from four pints of Water to half; then

exprime, et cola. Consume Liquorem colatum
express, and strain. Evaporate the strained Liquor

balneo aquoso, donec octarius cum semisse restet
in a water bath, until a pint and a half remains

ex toto ; tum, adjecto Saccharo,
from the whole ; then, the Sugar being added,

fiat Syrupus. Denique, contere Pulpas
let a Syrup be made. Lastly, triturate the Pulps

paulatim cum Syrupo, et, pulvere cribrato
gradually with the Syrup, and, the sifted powder

injecto, misce omnia.
being thrown in, mix the whole (together).

This preparation is seldom made as above, cheaper ingredients being substituted. When made as it ought to be, it forms a very pleasant and mild aperient for pregnant women, and those of a delicate habit of body, in doses of ʒj. to ℥ss. or more. It also serves as a vehicle for other purgatives.

PULVERES.

POWDERS.

Powders are very eligible forms for the exhibition of some medicines; but those substances which are possessed of an unpleasant taste cannot be administered in this state. Deliquescent and volatile salts are not conveniently dispensed in the form of powder. Some may suppose, that the finer any substance is powdered, the more active it will be when taken into the stomach; but experience proves that this is not always the case, for *guaiacum*, *cinchona bark*, *rhubarb*, and some other vegetable bodies, act much less energetically in a state of exceedingly minute division than when only coarsely powdered. The heat requisite to dry some substances previous to pulverization, often produces changes inimical to their virtues. Powders should be kept in dark coloured bottles, otherwise they become spoiled by the action of light.

PULVIS ALOES COMPOSITUS.

COMPOUND POWDER OF ALOES.

Recipe Extracti Aloës spicatæ unciam cum semisse;
Take of Extract of spiked Aloes an ounce and a half;

Gummi-resinæ Guaiaci unciam; Pulveris com-
of Gum-resin of Guaiacum an ounce; of the com-

positi Cinnamomi unciam dimidiam;
pound Powder of Cinnamon half an ounce;

Tere Extractum Aloës et Gummi-resinam
Rub the Extract of Aloes and the Gum-resin

Guaiaci separatim in pulverem; dein misce
of Guaiacum separately into a powder; then mix (them)

cum Pulvere composito Cinnamomi.
with the compound Powder of Cinnamon.

This is not an elegant form for the exhibition of so nauseous a medicine as aloes.

Prop.—A warm diaphoretic aperient.—Dose, gr. x. to ℈j. in form of bolus, or in any convenient liquid.

PULVIS CINNAMOMI COMPOSITUS.

COMPOUND POWDER OF CINNAMON.

Recipe Corticis Cinnamomi uncias duas;
Take of the Bark of Cinnamon two ounces;

Seminum Cardamomi unciam cum semisse;
of the Seeds of Cardamom an ounce and a half;

Radicis Zingiberis unciam; Fructûs
of the Root of Ginger an ounce; of the Fruit

Piperis longi unciam dimidiam;
of long Pepper half an ounce;

Tere	simul,	ut	pulvis subtilissimus
Rub (them)	*together,*	*that*	*a very fine powder*

fiat.
may be made.

Prop.—Stimulant, carminative.—Dose, gr. viij. to ℈j. in form of bolus, or in any convenient liquid.

Off. Prep.—*Pulvis Aloës comp.*

PULVIS CONTRAJERVÆ COMPOSITUS.

COMPOUND POWDER OF CONTRAJERVA.

Recipe	Radicis	Contrajervæ	contritæ
Take	*of the Root*	*of Contrajerva*	*powdered*
uncias quinque;		Testarum præparatarum	
five ounces;		*of prepared Shells*	
libram cum semisse;			
a pound and a half;			

Misce.
Mix.

Prop.—Stimulant, diaphoretic. Principally given to infants during dentition. The shells act as an antacid. —Dose, for an adult, gr. xv. to ℈ij., in any convenient vehicle.

PULVIS CORNU USTI CUM OPIO.

POWDER OF BURNT (HARTS') HORN WITH OPIUM.

Recipe	Opii duri	contriti	drachmam;
Take	*of hard Opium*	*powdered*	*a dram;*

Cornuum ustorum et præparatorum
of (Harts') horns burnt and prepared

unciam; Cocci contriti drachmam;
an ounce; of Cochineal powdered a dram;

Misce.
Mix.

Ten grains of this powder contain one grain of opium. The burnt harts' horn can be of no other use than to divide the opium more minutely, so as to expose a greater surface to the action of the stomach.—Dose, according to the quantity of opium necessary to be given.

PULVIS CRETÆ COMPOSITUS.

COMPOUND POWDER OF CHALK.

Recipe Cretæ præparatæ libram dimidiam; Corticis
Take of prepared Chalk half a pound; of Bark

Cinnamomi uncias quatuor; Radicis
of Cinnamon four ounces; of the Root

Tormentillæ, Gummi Acaciæ, singulorum
of Tormentil, (and) of the Gum of Acacia, of each

uncias tres; Fructûs Piperis longi
three ounces; of the Fruit of long Pepper

unciam dimidiam;
half an ounce;

Tere separatim in pulverem subtilissimum;
Rub (them) separately into a very fine powder;

dein misce.
then mix.

Prop.—Antacid, astringent. Useful in diarrhœas.—Dose, gr. x. to ʒss. in peppermint water, &c.

PULVIS CRETÆ COMPOSITUS CUM OPIO.

COMPOUND POWDER OF CHALK WITH OPIUM.

Recipe Pulveris compositi Cretæ uncias sex
Take of compound Powder of Chalk six ounces

cum semisse; Opii duri contriti
and a half; of hard Opium powdered

scrupulos quatuor;
four scruples;

Misce.
Mix.

Two scruples of this powder contain one grain of opium. It is more efficient in diarrhœas than the former powder, in consequence of the opium which it contains.

PULVIS IPECACUANHÆ COMPOSITUS.

COMPOUND POWDER OF IPECACUANHA.

Recipe Radicis Ipecacuanhæ contritæ,
Take of the Root of Ipecacuanha powdered, (and)

Opii duri contriti, singulorum drachmam;
of hard Opium powdered, of each a dram;

Sulphatis Potassæ contritæ, unciam;
of Sulphate of Potash powdered, an ounce;

Misce.
Mix.

Ten grains of this powder contain one grain of opium. The sulphate of potash is employed for the purpose of enabling the active ingredients, opium and ipecacuanha, to be brought into a more minute state of division, so as to expose a greater surface to the action of the stomach.—PROP. Powerfully diaphoretic. In the action of this powder, the opium from its stimulating nature propels the blood to the skin, the exhalants of which become relaxed by the ipecacuanha.—DOSE, gr. v. to ℈j., mixed with water, or in form of bolus. When the powder has been taken some time, its action is assisted by diluent drinks.

PULVIS KINO COMPOSITUS.

COMPOUND POWDER OF KINO.

Recipe drachmas quindecim Kino; Corticis
Take fifteen drams of Kino; of the Bark

Cinnamomi unciam dimidiam; Opii duri
of Cinnamon half an ounce; of hard Opium

drachmam;
a dram;

Tere separatim in pulverem subtilissimum,
Rub (them) separately into a very fine powder,

dein misce.
then mix.

One scruple of this powder contains one grain of opium.—PROP. Astringent and anodyne. Useful in chronic diarrhœas.—DOSE, gr. x. to ℈j.

PULVIS SCAMMONEÆ COMPOSITUS.

COMPOUND POWDER OF SCAMMONY.

Recipe Gummi-resinæ Scammoneæ,
Take of Gum-resin of Scammony, (and)

Extracti duri Jalapæ, singulorum uncias duas;
of hard Extract of Jalap, of each two ounces;

Radicis Zingiberis unciam dimidiam;
of the Root of Ginger half an ounce;

Tere separatim in pulverem subtilissimum,
Rub (them) separately into a very fine powder,

dein misce.
then mix.

Prop.—Hydragogue cathartic. Given in mucous obstructions of the bowels, in worm cases, and in dropsies. Its action may be improved by combining it with calomel. It is an useful cathartic for children troubled with mucous in the intestines.—Dose, for an adult, gr. x. to gr. xv., or more.

PULVIS SENNÆ COMPOSITUS.

COMPOUND POWDER OF SENNA.

Recipe Foliorum Sennæ, Supertartratis
Take of the Leaves of Senna, (and) of Supertartrate

Potassæ, singulorum uncias duas; Gummi-resinæ
of Potash, of each two ounces; of Gum-resin

Scammoneæ unciam dimidiam; Radicis Zingiberis
of Scammony half an ounce; of Root of Ginger

drachmas duas;
two drams;

Tere Gummi-resinam Scammoneæ per se,
Rub the Gum-resin of Scammony by itself,

cætera simul, in pulverem subtilissimum,
the other (ingredients) together, into a very fine powder,

tum misce.
then mix.

Prop.—Hydragogue cathartic.—Dose, ℈j. to ʒj. in form of electuary with confection of senna.

PULVIS TRAGACANTHÆ COMPOSITUS.

COMPOUND POWDER OF TRAGACANTH.

Recipe Tragacanthæ contritæ, Gummi
Take of Tragacanth powdered, of the Gum

Acaciæ contriti, Amyli, singulorum
of Acacia powdered, (and) of Starch, of each

unciam cum semisse; Sacchari purificati uncias tres;
an ounce and a half; of purified Sugar three ounces;

Tere Amylum et Saccharum simul
Rub the Starch and the Sugar together

in pulverem; tum, Tragacanthâ et Gummi
into a powder; then, the Tragacanth and the Gum

Acaciæ adjectis, misce omnia.
of Acacia being added, mix the whole (together).

Prop.—Demulcent.—Dose, ʒss. to ʒiij. mixed with water.

PILULÆ.

PILLS.

Pills are very convenient forms of exhibition for nauseous medicines, and those which act in small doses.

PILULÆ ALOES COMPOSITÆ.

COMPOUND PILLS OF ALOES.

Recipe Extracti Aloës spicatæ contriti unciam;
Take of Extract of spiked Aloes powdered an ounce;

Extracti Gentianæ unciam dimidiam; Olei
of the Extract of Gentian half an ounce; of the Oil

Carui minima quadraginta; Syrupi simplicis
of Carraway forty minims; of simple Syrup

quantum sit satis;
as much as may be sufficient;

Contunde simul, donec sit corpus unum.
Bruise (them) together, until there be one body.

The syrup is not required in forming these pills, as the extract of gentian renders the mass of a sufficient consistence.

Prop.—This is an useful purgative for the sedentary, and those of a leucophlegmatic habit.—Dose, gr. x. to ℈j.

PILULÆ ALOES CUM MYRRHA.

PILLS OF ALOES WITH MYRRH.

Recipe Extracti Aloës spicatæ uncias duas;
Take of Extract of spiked Aloes two ounces;

Stigmatum Croci, Myrrhæ, singulorum
of Stigmata of Saffron, (and) of Myrrh, of each

unciam; Syrupi simplicis quantum sit
an ounce; of simple Syrup as much as may be

satis;
sufficient;

Tere Extractum Aloës et Myrrham separatim
Rub the Extract of Aloes and the Myrrh separately

in pulverem; tum contunde omnia simul,
into a powder; then pound the whole together,

donec sit corpus unum.
until there be one body.

Prop.—This stimulating aperient is employed in chlorosis, hypochondriasis, &c.—Dose, gr. x. to ℈j.

PILULÆ CAMBOGIÆ COMPOSITÆ.

COMPOUND PILLS OF CAMBOGE.

Recipe Cambogiæ contritæ drachmam; Extracti
Take of Camboge powdered a dram; of Extract

Aloës spicatæ contriti drachmam cum semisse;
of spiked Aloes powdered a dram and a half;

Zingiberis drachmam dimidiam; Saponis
of Ginger half a dram; of Soap

drachmas duas;
two drams;

Misce Pulveres inter se, dein,
Mix the Powders together, then,

adjecto Sapone, contunde omnia simul,
the soap being added, pound the whole together,

donec sit corpus unum.
until there be one body.

Prop.—An active, hydragogue cathartic.—Dose, gr. x. to ℈j.

PILULÆ FERRI COMPOSITÆ.

COMPOUND PILLS OF IRON.

Recipe Myrrhæ contritæ drachmas duas;
Take of Myrrh powdered two drams;

Subcarbonatis Sodæ, Sulphatis Ferri,
of Subcarbonate of Soda, of Sulphate of Iron,

Sacchari, singulorum drachmam;
(and) of Sugar, of each a dram;

Tere Myrrham cum Subcarbonate Sodæ;
Rub the Myrrh with the Subcarbonate of Soda;

tum, Sulphate Ferri adjectâ, tere
then, the Sulphate of Iron being added, triturate (them)

iterum; dein contunde omnia simul, donec
again; then pound the whole together, until

sit corpus unum.
there be one body.

Sulphate of soda and *protocarbonate of iron* are formed by the action of the two salts on each other, and their water of crystallization being set at liberty serves to give consistence to the mass.

This pill may be given in the same cases as the *Mistura Ferri.*—Dose, gr. x. to ℈j.

PILULÆ GALBANI COMPOSITÆ.

COMPOUND PILLS OF GALBANUM.

Recipe Gummi-resinæ Galbani unciam;
Take of Gum-resin of Galbanum an ounce;

Myrrhæ, Sagapeni, singulorum
of Myrrh, (and) of Sagapenum, of each

unciam cum semisse; Gummi-resinæ Assafœtidæ
an ounce and a half; of Gum-resin of Assafœtida

unciam dimidiam; Syrupi simplicis quantum
half an ounce; of simple Syrup as much as

sit satis;
may be sufficient;

Contunde simul, donec sit corpus unum.
Pound (them) together, until there be one body.

Prop.—Antispasmodic, emmenagogue. Useful in chlorosis, hypochondriasis, &c.—Dose, gr. x. to ℈j.

PILULÆ HYDRARGYRI.

PILLS OF MERCURY.

Recipe	Hydrargyri purificati	drachmas duas;
Take	*of purified Mercury*	*two drams;*
Confectionis	Rosæ Gallicæ	drachmas tres;
of Confection	*of the Red Rose*	*three drams;*
Radicis	Glycyrrhizæ contritæ	drachmam;
of the Root	*of Liquorice powdered*	*a dram;*

Tere Hydrargyrum cum Confectione, donec globuli
Rub the Mercury with the Confection, until globules

conspiciantur non ampliùs; deinde, Radice
are seen no longer; then, the Root

Glycyrrhizæ adjectâ, contunde omnia
of Liquorice being added, pound the whole

simul, donec sit corpus unum.
together, until there be one body.

Three grains of these pills contain one grain of mercury.

By trituration, the mercury is converted into the state of protoxide. The oxidizement is known to be perfected, when a little of the mass rubbed on a piece of paper exhibits no metallic globules.

This is an useful form for the exhibition of mercury, when it is necessary to give it so as to affect the mouth, as in syphilis. It is also an excellent alterative. Should it act on the bowels, it may be conjoined with opium.—Dose, gr. v. to gr. viij. night and morning, until the mouth becomes affected, when it is necessary to carry its action to that extent. Equal parts of this, and the compound extract of colocynth, form a pill, which is very serviceable for bilious patients, and those who indulge in wine, and good eating. Five or ten grains is the dose.

PILULÆ HYDRARGYRI SUBMURIATIS COMPOSITÆ.

COMPOUND PILLS OF THE SUBMURIATE OF MERCURY.

Recipe Submuriatis Hydrargyri,
Take of Submuriate of Mercury, (*and*)

Sulphureti præcipitati Antimonii, singulorum
of precipitated Sulphuret of Antimony, of each

drachmas duas; Gummi-resinæ Guaiaci
two drams; of the Gum-resin of Guaiacum

contritæ semunciam; Spiritûs rectificati
powdered half an ounce; of rectified Spirit

drachmam dimidiam;
half a dram;

Tere Submuriatem Hydrargyri cum Sulphureto præ-
Rub the Submuriate of Mercury with the precipitated

cipitato Antimonii, dein cum Gummi-resinâ
Sulphuret of Antimony, then with the Gum-resin

Guaiaci, et adjice Spiritum, ut idonea cras-
of Guaiacum, and add the Spirit, that a proper con-

situdo fiat.
sistence may be formed.

Four grains of this pill contain about one grain of calomel.

This is commonly called *Plummer's pill,* and is considered an useful alterative in secondary syphilis, and in lepra, and other diseases of the skin.—Dose, gr. v. to gr. x. night and morning. It is usual to assist its action by giving the compound decoction of sarsaparilla along with it.

PILULÆ SAPONIS CUM OPIO.

PILLS OF SOAP WITH OPIUM.

Recipe Opii duri contriti unciam dimidiam;
Take of hard Opium powdered half an ounce;

Saponis duri uncias duas;
of hard Soap two ounces;

Contunde simul, donec sit corpus unum.
Pound (them) together, until there be one body.

Five grains of this pill contain one grain of opium.

PROP.—Anodyne. The dose must be regulated by the quantity of opium which it contains.

PILULÆ SCILLÆ COMPOSITÆ.

COMPOUND PILLS OF SQUILL.

Recipe Radicis Scillæ recèns exsiccatæ et
Take of the Root of Squill fresh dried and

contritæ drachmam; Radicis Zingiberis contritæ,
powdered a dram; of Root of Ginger powdered,

Saponis duri, singulorum drachmas tres;
(and) of hard Soap, of each three drams;

Ammoniaci contriti drachmas duas;
of Ammoniac powdered two drams;

Misce Pulveres inter se; deinde contunde
Mix the Powders together; then pound (them)

cum Sapone, et adjice quantum sit satis
with the Soap, and add as much as may be sufficient

Syrupi simplicis, ut idonea crassitudo fiat.
of simple Syrup, that a proper consistence may be formed.

PROP.—Stimulant, expectorant, diuretic. It is given in chronic affections of the chest, and may be advantageously conjoined with digitalis and calomel in dropsy. —DOSE, gr. iv. to gr. x.

PRÆPARATA EX ANIMALIBUS.

PREPARATIONS FROM ANIMALS.

A NUMBER of compounds are derived from the animal kingdom, which, like those afforded by vegetables, are called *proximate principles.* The elements constituting the chief of these principles are *carbon*, *oxygen*, *hydrogen*, and *azote.* Azote, the presence of which principally serves to distinguish animal from vegetable matter, is altogether wanting in some of the substances about to be enumerated. The disposition which animal matter has to undergo, decomposition or putrefy, after the vital principle is extinct, is owing to the presence of azote; for those substances which do not contain it, such as the animal oils, fat, spermaceti, &c., may be preserved when pure, without a tendency to putrefaction manifesting itself. Besides the four principal elements just mentioned, we find animal matter to contain *sulphur*, *phosphorus*, *iron*, and *earthy*, and *saline bodies.*

Animal, like vegetable matter, is distinguished from that of the mineral kingdom by not being capable of being formed synthetically; for while we are able to imitate nature in forming the products of the mineral kingdom, we cannot succeed in producing gum, sugar, fibrin, albumen, oil, &c. by the direct union of the elements composing these bodies; so that it would appear that the vital principle plays some part in their production, which is beyond the reach of mere chemical action. Animal matter, like that derived from vegetables, is decomposed at a red heat, and its destructive distillation gives rise to compounds which have been partly described in the note at the bottom of page 96. Animal substances in general, during combustion, give off the smell emitted by burning feathers or hair.

The analysis of organized bodies, although the number of their elements is very limited, is extremely difficult, and the results arrived at by different chemists, in respect to the proportions in which these elements are combined, are often extremely various.

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§ 1. Of oils and fats, and the acids they afford.

Animal oils and fats resemble the fixed oils of vegetables in their composition, being constituted of carbon, hydrogen, and oxygen, and in general consisting of stearine and eläine, see page 205. Being cheaper than the fixed oils, they are generally substituted for them in this country in the manufacture of soap, see *Sapo*, page 60. *Animal oil of Dippel*, formerly employed for the purposes of medicine, differs from the other animal oils in being volatile. This oil is obtained by submitting animal matter, especially that containing albumen and gelatine, to destructive distillation. By re-distillation it is rendered limpid, clear, and transparent.

It has already been stated, page 61, that during the formation of soap, two acids are generated, namely, the *margaric* and *oleïc*, besides which a peculiar compound is also formed, called *glycerine*.

*Margaric Acid** being insoluble in water, is readily obtained by adding a stronger acid to its salts in solution; by which means the base with which it is united is abstracted, and itself precipitated. It is readily soluble in hot alcohol, and as the saturated solution cools, it is deposited in form of a crystalline mass having a pearly lustre. The salts which it forms with alkalies, as in

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* From μαργαριτης, *a pearl.*

the soaps, are readily soluble in water, but its other salts are only sparingly soluble in that fluid. It consists of carbon, oxygen, and hydrogen, and its crystals contain water.

Oleic Acid. When soap is made with potash and linseed oil, it consists principally of oleate of potash, which salt may be separated from the margarate of potash which is present, by dissolving in cold alcohol. The alcohol being distilled over, the oleate of potash is then to be dissolved in water, when the oleic acid may be separated from its base by the addition of a stronger acid. Oleic acid is a colourless, oily fluid, lighter than water, and congeals at a temperature approaching to zero. It will not unite with water, but combines with alcohol in all proportions. Of the oleates which it forms with bases, those only of soda and potash, contained in the soaps, are soluble in water. It consists of carbon, hydrogen, and oxygen, and contains a little water.

Glycerine, the mild or sweet principle of oils, originally noticed by Scheele, is left in the mother liquor, when soap is prepared by means of potash, and the oils or fats. It is separated by neutralizing the free alkali which is present with sulphuric acid, and then evaporating to the consistence of syrup. When the residue is treated with alcohol, the glycerine is dissolved, and by distilling the alcoholic solution, it is left in the form of an uncrystallizable syrup. Glycerine is heavier than water, has a sweet taste, and is soluble in both water and alcohol. This compound has been particularly noticed by Chevreul. It consists of carbon, oxygen, and hydrogen.

Stearic Acid, which very much resembles margaric acid in appearance and properties, is formed along with the margaric and oleic acids, when soap is made with potash and hogslard or suet. Other acids are also formed along with the margaric and oleic when peculiar fats are employed, thus:—

Phocenine is a peculiar kind of fatty matter contained in the oil of the porpoise along with eläine, and when formed into soap, it gives rise to a volatile odoriferous acid termed *phocenic acid.*

Hircine is a peculiar kind of fatty matter which exists in the fat of the goat and sheep. It affords the *hircic acid* when employed in forming soap.

Butyrine. A peculiar oleaginous substance which is quite fluid at 70° F. is contained in butter. When formed into soap it gives rise to three volatile odoriferous acids, called the *butyric*, *caproic*, and *capric*.

Sebacic Acid is yielded by distilling hogslard or suet: it comes over along with acetic acid and fat. It is separated from the fat by means of boiling water, and from the acetic acid by acetate of lead: sebate of lead precipitates, and may be decomposed by sulphuric acid. Sebacic acid melts like fat when heated, and as it cools, it crystallizes in small white needles. It has an acid reaction, is soluble in hot and cold water, but more soluble in alcohol.

Spermaceti. When the substance which is obtained from the head of the spermaceti whale is submitted to pressure, a quantity of limpid oil is afforded, (which is preferable to *train oil*, obtained from the blubber of the whale by means of heat, as a fuel for argand lamps,) and a residue is left, which, when purified, is called *spermaceti*, see page 23. When this substance is formed into soap with potash, an acid is produced which is called by Chevreul *cetic acid.* By dissolving spermaceti in boiling alcohol, it is freed from some fluid oil, which adheres to it after it has been submitted to the usual process of purification, and as the solution cools, it is precipitated in a state of purity in the form of white crystalline plates. In this state it is called *cetine* by Chevreul.

Adipocire. This fatty substance is obtained by exposing a piece of fresh muscle for some time to the action of water, or placing it in moist earth; by which means the fibrin is destroyed by the putrefactive process which is set up. It is, however, supposed by many chemists that the fibrin itself becomes changed into adipocire. Chevreul considers adipocire a sort of soap, composed principally of margarate of ammonia, the ammonia of which is the result of the decomposition of the fibrin.

*Cholesterine.** The crystalline matter, forming the basis of biliary concretions, is known under this name. This and the last two described substances have been considered as identically the same by Fourcroy, who accordingly applied the term *adipocire* to each. Chevreul, however, has shewn that cholesterine is a principle entirely different from spermaceti, although resembling that substance in appearance. Spermaceti forms soap with potash, and liquefies at a temperature lower than that of boiling water; cholesterine does not form soap with potash, and requires a temperature of 278° F. to liquefy it. It is insoluble in water, but readily soluble in boiling alcohol, and as the solution cools, it precipitates in form of white scales of a pearly lustre. When acted upon by concentrated nitric acid, it dissolves, nitric oxide gas is evolved, and a yellow substance is obtained as the solution cools, which possesses acid properties and is called *cholesteric acid.* By dissolving this in alcohol, and allowing the solution to evaporate spontaneously, it is deposited in white needle-shaped crystals. This acid forms salts with bases called *cholesterates.*

Pure cholesterine is obtained by boiling human biliary calculi in alcohol, after having reduced them to powder. The solution is to be filtered as hot as possible, and as it cools the chief part of the cholesterine which it contains precipitates free from the colouring matter of the biliary calculi. Cholesterine has also been obtained from human bile, and from that of several other animals, and has likewise been found in parts which have no connection with the hepatic circulation, and in those fluids which are the consequence of diseased vascular action.

Ambergris is a substance which is found floating on the surface of the ocean in different parts of the world,

* From χολη *bile*, and στερεος *solid.*

and is regarded as a concretion formed in the stomach of the spermaceti whale. It is principally composed of a substance resembling cholesterine, which has received the name of *ambreine*, and this affords a distinct acid called *ambreic acid*, by being acted upon by nitric acid.

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§ 2. Animal Acids.

Besides the acids already mentioned in the preceding Section, which are indirectly derived from some animal productions, there are also acids which are present in others in a free state or in combination with a base.

Ammiotic Acid is an acid which has been obtained from the *liquor amnii* of the cow. By gently evaporating that fluid, it is obtained in white needle-shaped crystals. It is only slightly soluble in water. With alkalies it forms salts.

Formic Acid. This acid is obtained from ants. It resembles acetic acid in odour and volatility, but not in composition. It differs only from oxalic acid in containing 1 atom of hydrogen, its atomic weight being 37. Döbereiner obtained it artificially from a mixture of tartaric acid, peroxide of manganese, and water, by means of a moderate heat: it appears that formic acid, carbonic acid, and water result from the decomposition of the tartaric acid by the peroxide of manganese. It has also been procured in the artificial way by other means.

Hippuric Acid.* This acid, which is deposited from the urine of the horse after it has been mixed with muriatic acid, is supposed to be merely benzoic acid in combination with animal matter.

Lactic Acid. The acid so called is contained in sour milk, but it appears to be merely acetic acid combined with animal matter.

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* From ιππος *a horse*, and ουρη *urine*.

LITHIC * or URIC † ACID. This acid is contained in those concrete substances which are formed in urinary and gouty diseases. It is always contained in healthy urine in combination with ammonia or some other alkaline base. Urate of ammonia constitutes the principal part of the urine of serpents and birds of prey.‡ Uric acid is readily obtained as follows: digest the powdered urine of the *boa constrictor* in a solution of pure potash; the potash unites with the uric acid of the urate of ammonia, and the ammonia is evolved. The solution of urate of potash is then to be decomposed by adding either muriatic, sulphuric, or acetic acid, a little in excess, which unites with the potash, and the uric acid is precipitated, and is to be washed, and collected on a filter. It is at first separated in the form of hydrate, a gelatinous compound which soon decomposes spontaneously, depositing small crystals of uric acid, which when pure are white, and have neither taste nor smell. According to Prout this acid requires 10.000 times its weight of water at 60° F. for solution. It is also very insoluble in hot water, and quite insoluble in alcohol. It unites with alkaline bases, and forms salts, which are called *lithates* or *urates*, and it has an acid reaction on litmus paper. It is not affected by being exposed to the atmosphere. According to the analysis of Dr. Prout its composition is as follows:

6 Atoms	carbon	= 36
2 ——	hydrogen	= 2
3 ——	oxygen	= 24
2 ——	azote	= 28
		90

* From λιθος, *a stone*.

† From ὀυρη, *urine*.

‡ If we examine the fæces of birds or serpents, we find them covered with a white coating; this is the urine of those animals.

From the analysis of Dr. Thomson, it would appear that Dr. Prout's results have not been afforded by the acid in a perfectly anhydrous state; for by exposing 90 parts of the crystallized acid to a temperature of 400° F. it loses two atoms of water and is then anhydrous, consisting of

6 Atoms carbon	=	36
1 Atom oxygen	=	8
2 Atoms azote	=	28
		72

By allowing for the 2 atoms or 18 parts of water, expelled by drying, the analyses of these chemists are in perfect unison. The test for this acid is given in the Appendix.

By submitting uric acid to destructive distillation in a glass retort, it affords carbonate and hydrocyanate of ammonia, urea, and a volatile acid called *pyro-uric acid*. The last of these compounds is said to be the same as the cyanic acid.

Purpuric Acid. This acid was first described as a distinct compound by Dr. Prout. Its name is given to it from the property which it has of forming purple-coloured salts with alkaline bases, although colourless when pure. The following directions, which we take the liberty to transcribe from Dr. Turner's Elements of Chemistry, were given to Dr. Turner by Dr. Prout:—" Let 200 grains of uric acid, prepared from the urine of the *boa constrictor*, be dissolved in 300 grains of pure nitric acid diluted with an equal weight of water, the uric acid being added gradually in order that the heat may not be excessive. Effervescence ensues after each addition, nitrous acid fumes appear, heat is evolved, and a colourless solution is formed, which, on standing in a cool place for some hours, yields colourless crystals, which have the outline of an oblique rhomboidal prism. By gentle evaporation an additional quantity may be obtained. They contain nitric and purpuric acid, and ammonia, should be dissolved in water, and be exactly neutralized by pure ammonia; and the liquid is then to be digested in a solution of pure potash until the ammonia is wholly expelled. On pouring this solution into dilute sulphuric acid, purpuric acid is set free, and, being insoluble in water, subsides as a granular powder, of a white colour if pure, but commonly of a yellowish-white tint." Considerable uncertainty prevails as to the nature and composition of purpuric acid.

Rosacic Acid. Proust gave this name to the acid, which is supposed to exist in the *lateritious sediment* deposited in the urine in certain stages of fever. "Dr. Prout is of opinion that it contains some purpurate of ammonia; and as he has detected the presence of nitric acid in the urine from which such sediments were deposited, he thinks it probable that the purpurate may be generated by the reaction of the uric and nitric acids on each other in the urinary passages." *(Dr. Turner's Elements of Chemistry.)*

Besides the acids above described, and which are considered peculiar to animals, the *sulphuric*, *muriatic*, *phosphoric*, and other acids are also found in animal bodies.

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§ 3. Animal substances, which are neither of an acid nor oily nature.

Albumen forms an important ingredient in both the fluid and solid parts of animal bodies, as will be hereafter shown. It appears to exist in the living animal in a solid as well as fluid state. The most familiar form of albumen is as it exists in the white of eggs, which is almost entirely composed of it. In this the albumen is combined with water, free soda, and saline matter. Albumen soon undergoes decomposition, if kept in a fluid state; but when dried by spreading it in thin layers, and exposing it to a current of air, it may be kept for any length of time, and retains its property of being soluble in water. Liquid albumen is coagulated by hot water, which distinguishes it from all other animal fluids. According to Dr. Bostock, water which contains only $\frac{1}{1000}$th of its weight of albumen becomes opaque by boiling, and undiluted albumen coagulates at a temperature of 160° F. It is also coagulated by alcohol and the stronger acids. From the property which albumen possesses of being coagulated by hot water, it is employed for clarifying several substances; see *potassæ supertartras*, page 53: the undissolved foreign bodies becoming entangled in it are carried to the surface of the liquid. There is a difference of opinion amongst chemists respecting the cause of albumen coagulating under certain circumstances. In our opinion, that modestly advanced by Dr. Turner in his Elements is the most plausible: he believes that "albumen combines directly with water at the moment of being secreted, at a time when its particles are in a state of minute division; but as its affinity for that liquid is very feeble, the compound is decomposed by slight causes, and for the same reason the albumen becomes quite insoluble, as soon as it is rendered solid by coagulation." Coagulated albumen is difficultly distinguished from fibrin. The results of the analyses of albumen by Gay-Lussac and Thénard, and Dr. Prout, reduced to theory, are as follows:

Gay-Lussac, and Thénard.	Dr. Prout.
17 Atoms carbon	15 Atoms carbon
13 —— hydrogen	14 —— hydrogen
6 —— oxygen	6 —— oxygen
2 —— azote	2 —— azote

Fibrin is abundantly contained in the blood, and the insoluble part of the muscles is entirely composed of it. It may be readily procured by digesting small slices of the lean part of meat in successive portions of water, until it is obtained quite colourless. Another way is to stir blood, recently taken from the body, with a stick whilst it coagulates, after which it is to be washed with water until all the colouring particles are removed. Fibrin, as thus obtained, is a solid substance, possessing neither taste nor smell. In a moist state it is soft and slightly elastic; but when dried it is rendered hard and brittle, and has a semitransparent appearance. It is insoluble in cold water, and is only rendered sparingly soluble by long boiling in that liquid. When exposed to warmth and moisture it soon putrefies. It is dissolved by a pure solution of potash or ammonia; and some of the acids have a peculiar action upon it. The results of the analyses of Gay-Lussac, and Thénard, reduced to theoretical numbers, give the composition of fibrin as follows:

18 Atoms carbon
14 ——— hydrogen
5 ——— oxygen
3 ——— azote

GELATINE is contained in the solid parts of the body, such as the skin, membranes, cartilages, tendons, and bones; but it is never found in the fluid parts when in a state of health. Gelatine is very readily dissolved by boiling water, and as the solution cools it becomes a semitransparent, tremulous jelly, which, without any other test, is sufficient to distinguish it from all other animal substances. When deposited in this way, it is in the state of hydrate, and the water with which it has combined is sufficient to render it liquid on the application of heat. Portable soup and other animal jellies, which are met with at confectioners, are very familiar forms of gelatine. *Glue* is another form of this substance, prepared by boiling the clippings of skins, hoofs, and other refuse parts of animals, in water, and then evaporating the solution so as to drive off the moisture. In this dried state it may be kept for any length of time. *Size* is made from the shavings of parchment, but is not evaporated. *Isinglass* is a very pure form of gelatine; it is prepared in a similar way to glue from the sounds of the sturgeon, and other fish of the genus *acipenser*.

Gelatine is insoluble in alcohol; but is very soluble in most dilute acids, and in the solutions of potash, soda, and ammonia. With tannin it forms an insoluble compound, *tanno-gelatine*, which, as already described at page 200, is the basis of leather. According to Gay-Lussac, and Thénard, it is composed of,

15 Atoms carbon
14 ——— hydrogen
6 ——— oxygen
2 ——— azote

which numbers correspond with those expressive of Dr. Prout's analysis of albumen reduced to theoretical calculation as at page 349.

UREA. To obtain urea, let fresh urine be evaporated to the consistence of syrup; and when cold, add to it, by degrees, pure concentrated nitric acid, till a dark coloured crystalline mass is afforded; wash this, which is impure nitrate of urea, with repeated affusions of ice-cold water, and dry by means of blotting paper. Then add a tolerably strong solution of carbonate of potash or soda, to remove the nitric acid; concentrate the solution by evaporation, and set it aside that the nitrate formed may crystallize: an impure solution of urea then remains. Dr. Prout recommends this to be made into a thin paste with animal charcoal, which is to be allowed to remain for a few hours, and then to be mixed with cold water; by which means the urea becomes dissolved, and the colouring matter remains with the charcoal. After evaporating the solution of urea to dryness at a low temperature, the residue is to be boiled in pure alcohol; the urea is deposited in crystals as the solution cools. To obtain the crystals quite pure, they must be repeatedly dissolved in alcohol. The crystals of urea when quite pure are colourless, of a slight pearly lustre, and transparent.

Urea, when tasted, leaves an impression of coldness on the tongue, and has a peculiar smell. It has neither an acid nor alkaline reaction; but with the oxalic and nitric acids it combines and forms compounds, which crystallize from their solutions in scales of a pearly lustre. Water dissolves more than its own weight of urea at 60°, and boiling water dissolves it in any proportion. It is much more soluble in boiling than in cold alcohol. When exposed to a moist atmosphere, the crystals become slightly deliquescent; but are not in any other way acted upon. A solution of urea in water may also be exposed to the air for a long period without any change being perceptible; and when the solution is boiled it is not affected; but when the other ingredients of urine are present it soon becomes decomposed, and is likewise changed at the boiling temperature, which, if continued, converts it into carbonate of ammonia. Urea is decomposed by the fixed alkalies and alkaline earths, particularly by means of heat; carbonate of ammonia is nearly the sole product. Urea has been obtained artificially by Wöhler. According to Dr. Prout urea consists of,

2 Atoms hydrogen
1 ——— oxygen
1 ——— azote
1 ——— carbon

Sugar of Milk is obtained in crystals by evaporating whey to the consistence of syrup, and then letting it cool. It must be purified with albumen, and then re-crystallized. It differs considerably from the sugar obtained from the sugar cane, being less sweet, less soluble in water, and altogether insoluble in alcohol, and incapable of undergoing the vinous fermentation. When digested in nitric acid, it affords *saccholactic acid*, as already described, which serves to distinguish it from all other kinds of sugar. It contains no azote, and when acted upon by very dilute sulphuric acid it is converted into real sugar, after the manner of starch. The oxygen, hydrogen, and carbon which it contains, are nearly in the proportions in which these elements exist in common sugar.

Sugar of Diabetes. This is obtained by evaporating the urine of *diabetic* patients to the consistence of syrup, and keeping it in a warm situation for some days. The crystallized mass which is obtained may be purified by washing with cold alcohol till that liquid comes off colourless; it is then to be dissolved in hot alcohol, and by repeated crystallization it is eventually obtained pure (Prout). This kind of sugar is perfectly analogous to that procured from vegetables.

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§ 4. Of animal fluids.

Blood. Whilst this fluid is circulating in the body, it is of a florid-red colour in the arteries, and of a dark-purple colour in the veins. It is found of different degrees of specific gravity. Mr. Brande says it varies from 1.050 to 1.070: the former number may be considered as about the average. Its temperature in man when in a state of health is about 98° or 100° F. Blood is characterized by a peculiar smell, a slightly saline taste, and an unctuous touch. It appears one uniform fluid to the naked eye after being recently drawn; but when examined by a good microscope, a number of red globular particles are seen floating in a colourless fluid. Shortly after it has been drawn it coagulates, separating into a fluid part called *serum*, which is of a pale straw colour, and a thick part called *crassamentum*, *cruor*, or *clot*, which is red. The cause of the coagulation of the blood is not known.

The average specific gravity of the serum is about 1.030. Serum reddens turmeric paper, and changes the blue colour of violets green, owing to the presence of a little free soda. Like other liquids which contain albumen, it coagulates by means of heat, acids, alcohol, &c. When the coagulum obtained from it by heat is subjected to gentle pressure, it affords a limpid, colourless fluid called the *serosity*, which contains, according to Dr. Bostock, about one-fiftieth of its weight of animal matter, together with a little muriate of soda. A portion of this animal matter is albumen, which may be easily coagulated by means of galvanism, and a small portion of some other principle is present, which is neither albumen nor gelatine. The following are the analyses of serum by the late Dr. Marcet and Berzelius.

Marcet.

Water	900
Albumen	86.8
Muriates of potash and soda	6.6
Muco-extractive matter	4.0
Carbonate of soda	1.65
Sulphate of potash	.35
Earthy phosphates	.60
	1000.00

Berzelius.

Water	905.0
Albumen	80.0
Muriates of potash and soda	6.0
Lactate of soda with animal matter	4.0
Soda and phosphate of soda with do.	4.1
Loss	.9
	1000.0

The crassamentum consists of two parts, the *fibrin* and *colouring principle*. Fibrin has been already described as a distinct proximate principle at page 349. The colouring principle of the blood, according to Prevost and Dumas, consists of a number of distinct particles, which are of an elliptical form in birds and cold-blooded animals, and globular in mammiferous animals. These globules are insoluble in the serum; but their colour is taken up by water, acids, alkalies, and alcohol. There is great diversity of opinion amongst chemists respecting the nature of the colouring matter of these globules. It has been proved to depend on the presence of iron, but the state in which the iron is combined has not yet been determined.

The coagulation of the blood is assisted by heat; but retarded by cold: thus, blood drawn in the summer coagulates much sooner than in winter. Coagulation is also influenced by the rapidity with which the blood is drawn from the body. It has been noticed by Dr. Scudamore, that blood drawn slowly from a vein sooner coagulates than when abstracted in a full stream.

When blood is drawn from healthy patients the crassamentum is found of an uniform red colour throughout; but when it is drawn from those labouring under inflammatory diseases, the crassamentum is covered with a whitish coat, called the *buffy coat*. In the former case, the fibrin coagulates before the red particles have time to subside; in the latter case, from some unknown cause, the red globules sink to the bottom before the fibrin has become solid; so that the upper surface of the crassamentum, or buffy coat, is fibrin deprived of the colouring particles of the blood.

Saliva. This fluid, which is secreted by the salivary glands, mixes with the food in the mouth, and assists in forming it into a mass convenient to be swallowed. When saliva is mixed with distilled water, a flaky substance subsides which is mucus. Mr. Brande by means of galvanism has obtained a coagulum from the clear solution, and was hence induced to consider that albumen is present. There is also contained in the saliva a peculiar animal matter which has been termed *salivary matter*, and a small quantity of animal matter which Tiedemann and Gmelin believe to be *osmazome*. According to Berzelius 1000 parts of saliva afford only 7 of solid matter, all the rest being water. Muriate of potash, according to Tiedemann and Gmelin, is the principal saline ingredient; but the sulphate, acetate, carbonate, phosphate, and sulphocyanate of potash, are also contained in it. It is owing to the presence of the latter salt that the saliva strikes a red colour with a per-salt of iron. A very small quantity of soda is also found in the saliva.

Pancreatic juice. The juice secreted by the pancreas has been said to be very similar in its nature to the saliva. Tiedemann and Gmelin have proved it to differ from that fluid. It contains albumen, a curdy substance, a small quantity of *salivary matter*, and *osmazome*. Its saline ingredients are nearly the same as those of saliva, but the sulphocyanic acid is not present. The pancreatic juice reddens litmus paper, owing to a free acid being present, which is probably the acetic. The use of the pancreatic juice is not known.

GASTRIC JUICE. When the gastric juice is collected from the stomach of an animal that has been killed while fasting, it is transparent, having a saline taste, and neither an acid nor alkaline reaction; but when taken from the stomach of an animal in which the process of digestion is going on, it is then characterized by acid properties. Dr. Prout has discovered free muriatic acid in the stomach of the rabbit, hare, horse, calf, and dog; and he has also found it to exist in the sour matter sometimes ejected from the stomachs of those persons who labour under indigestion. It has been ascertained by Tiedemann and Gmelin, that the acid secretion is set up in the stomach whenever it receives food, or any foreign body destitute of nutritious matter, such as flint-stones, &c.; but those substances which are of a stimulating nature occasion it to be secreted in a greater quantity. This secretion, according to the same chemists, consists of free mutriatic and acetic acids.

The gastric juice is possessed of very powerful solvent properties, and by acting upon the food in the stomach converts it into a semifluid substance called *chyme*.

BILE is an unctuous fluid of a yellowish-green colour, of an intensely bitter taste, and of an extremely nauesous odour. It is heavier than water. The following table shews the composition of the bile of the ox according to Thénard:

Water	700
Resin	15
Picromel	69
Yellow matter	4
Soda	4
Phosphate of soda	2
Muriates of soda and potash	3.5
Sulphate of soda	0.8

Phosphate of lime and magnesia..	1.2
Oxide of iron..................	a trace.

The *picromel* mentioned above is a peculiar substance having a sweetish bitter taste, whence its name; but in a pure state it is devoid of bitterness. It contains azote.

The following is the composition of the bile of the ox, according to Tiedemann and Gmelin:

Water to 91.5 per cent.
A volatile odoriferous principle
Cholesterine
Resin
Asparagin
Picromel
Yellow colouring matter
A peculiar azotized substance, soluble in water and alcohol
A substance soluble in hot alcohol, but insoluble in water supposed to be gluten
Osmazome
A principle which emits an urinous smell when heated
A substance analogous to albumen or caseous matter
Mucus

The salts of the bile are:

Margarate, Oleate, Acetate, * *Cholate*, Bicarbonate, Phosphate, Sulphate, Muriate — of Soda
Phosphate of lime

* The acid of this salt, the *cholic*, is a peculiar acid. It crystallizes in needles, reddens litmus paper, and has a sweet taste.

Human bile has not been so carefully examined as that of the ox. It contains, according to Thénard, water, salts, colouring matter, albûmen, and a species of resin. Picromel has been detected in it by Chevallier, and cholesterine by Chevreul.

The bile, acting in some unknown manner on the chyme, after it has passed from the stomach into the duodenum, assists in converting it into *chyle*. It also appears to act as a stimulus to the intestinal canal.

Biliary calculi are of two kinds; the more common kind are soft, fusible, inflammable, and of a crystalline texture. They consist either of cholesterine in combination with colouring matter, or of nearly pure cholesterine, see page 344. The other kind resemble inspissated bile in appearance; and in some rare instances the cholesterine is altogether wanting. The gall-stone of the ox is insoluble in water and alcohol. It appears to consist principally of the yellow colouring matter of bile, and from the beauty and permanence of its colour, it is employed as a pigment by painters.

*Erythrogen** is the name given to a peculiar substance discovered by Bizio in a fluid very different from bile which was found in the gall-bladder of a person who died of jaundice.

Chyle is the fluid which is absorbed from the small intestines by the *lacteals*, which terminate in one common trunk called the *thoracic duct*. In this duct the chyle becomes mixed with lymph, and is eventually poured into the venous system.

Chyle, when taken from the thoracic duct of a mammiferous animal about three hours after a meal, is a white, opaque fluid resembling milk. Its taste is sweetish and saline. Its specific gravity is less than that of the blood. When tested by infusion of violets it shews a slight alkaline reaction. Like the blood it

* From Ερυθρος *red*, because it gives rise to a red-coloured compound when placed under certain circumstances.

coagulates out of the body. In a few minutes after being taken from the duct it gelatinizes spontaneously; and some hours afterwards, it becomes separated into a firm yellowish-white coagulum which is insoluble in water, and a colourless transparent serum. It is stated by Mr. Brande, " that the coagulum possesses properties closely resembling those of the caseous portion of milk, and may hence be considered as a variety of albumen; the serum when heated deposits a few flakes of albumen, and by evaporation to dryness affords a small proportion of a substance analogous to sugar of milk. Small portions of phosphate of lime, carbonate of soda, and common salt, may also be detected in the chyle. In these experiments I found no distinctive difference in the chyle of graminivorous and carnivorous animals." Dr. Prout considers the deposition which takes place on heating the serum to be *incipient albumen.* The following table shews the analysis of chyle taken from a dog fed on animal food, and that of another dog fed on vegetable food:

	Vegetable food.	Animal food.
Water	93.6	89.2
Fibrin	0.6	8
Incipient albumen?	4.6	4.7
Albumen with a little red colouring matter	0.4	4.6
Sugar of milk?	a trace	——
Oily matter	a trace	a trace
Saline matters	0.8	0.7
	100.0	100.0

" In chyle we cannot fail to observe a close approximation to the blood; it is deficient only in colouring matter, and the albumen which it contains differs a little from that existing in the blood itself; it appears, therefore, that the albumen is perfected, and the colouring matter formed, in the process of circulation; the saccharine principle of the chyle is also no longer perceptible." *Brande.*

MILK. The chemical properties of milk are said to be slightly different in different animals. The following are the principal characteristics of cow's milk: Its specific gravity varies from 1.018 to 1.020. It boils at rather a higher temperature than water, but freezes at the same temperature as that fluid. After standing some hours the *cream* separates and floats on the surface. The remaining milk, after the removal of the cream, appears of a bluish-white colour; soon turns sour, and becomes separated into two portions, one of which is solid, and is called *curd;* the other, called *whey*, is liquid. The curd and whey may also be separated by adding some acid, or the liquor called *rennet*, which is an infusion of the inner coat of the stomach of a calf in hot water.

Cream, by churning, separates into *butter* and *butter-milk*. Butter-milk is whey united with some curd. 100 parts of cream of sp. gr. 1.024, according to Berzelius, consist of

Butter.........	4.5
Curd..........	3.5
Whey..........	92.0
	100.0

Butter ranks with the animal oils; see *butyrine* page 343.

The curd of milk, called also *caseous matter*, from its forming the basis of cheese, resembles albumen in some respects, and differs from it in others. When kept in a moist state it undergoes fermentation like gluten, giving rise to two compounds, the *caseic acid* and *caseous oxide;* see page 201. Proust states that the peculiar flavour of cheese, is owing to caseate of ammonia under different states of modification.

The following table shews the proportions of the elements of caseous matter according to Gay-Lussac, and Thénard:

Carbon	59.781
Hydrogen	7.429
Oxygen	11.409
Azote	21.381
	100.000

It affords 6.5 per cent. of a white ash by incineration, which is principally phosphate of lime.

Milk, when carefully deprived of its cream, is of about the specific gravity of 1.033. According to Berzelius it is constituted as follows:

Water	928.75
Caseous matter with a trace of butter	28.00
Sugar of milk	35.00
Muriate and phosphate of potash	1.95
Lactic (acetic) acid, acetate of potash, and a trace of lactate of iron	6.00
Earthy phosphates	0.30
	1000 00

The whey or serum of milk is a transparent, pale-yellow fluid, possessed of a sweetish flavour. It contains all the above ingredients, deducting the caseous matter. Sugar of milk has already been mentioned. Milk and caseous matter are useful articles of food for young animals, on account of the phosphate of lime they contain.

Eggs.—New laid eggs are rather heavier than water. They become lighter after a time, water escaping, according to Dr. Prout, through the pores of the shell, and air being substituted in its place. An ordinary-sized egg yields to boiling water, about three-tenths of a grain of saline matter, together with animal matter, and a little free alkali. An egg weighing 1000 grains consists of—

Shell	106.9
White	604.2
Yolk	288.9
	1000.0

The *shell* contains—

Animal matter	2
Phosphate of lime and magnesia..	1
Carbonate of lime, with a little carbonate of magnesia	97
	100

The *white*, which consists principally of albumen, contains sulphur.

The *yolk* contains a considerable quantity of yellow, oily matter, which may be obtained by pressure after boiling. By treating the boiled yolk with alcohol, until that fluid comes off colourless, a white pulverulent substance remains, which, in many respects, resembles albumen, but differing from it in containing a large quantity of phosphorus, in an unknown state of combination. The alcoholic solution is of a deep-yellow colour; it deposits crystals of a sebaceous matter, and a portion of yellow semi-fluid oil. The use of the phosphorus contained in the yolk is evidently to afford phosphoric acid for forming the bones of the chicken; but Dr. Prout is unable to account for the lime with which that acid unites in forming the earthy part of bone, as it has neither been detected in the white nor yolk, and no vascular connexion seems to exist between the chicken and the shell.

Lymph is that liquid which lubricates the different cavities of the body; it is contained in the lymphatics, and forms the chief contents of the thoracic duct, when an animal has been kept for a length of time without food. The fluid of dropsy, and that of blistered surfaces, is of a similar nature to lymph.

According to Dr. Bostock, the liquid of the pericardium consists of—

Water	92
Albumen	5.5
Mucus	2
Muriate of Soda..	.5
	100.0

The several fluids alluded to, are, however, found to differ from each other in the nature of their ingredients.

Mucus.—The fluid secreted by mucous surfaces is known by this name. Dr. Bostock applies the term to a peculiar animal matter, the existence of which has not been sufficiently established. The external characters of mucus are seen in the fluid which distils from the nose.

Synovia.—This fluid lubricates the surfaces of joints. According to Mr. Hatchett, it contains a small portion of phosphate of lime, and phosphate of soda and ammonia, along with albumen.

Humours of the Eye.—The *tears* contain water, muriate and phosphate of soda, and some other salts, free soda, and animal matter.—The *aqueous* and *vitreous humours*, according to Berzelius, contain more than 80 per cent. of water, with albumen, muriate and acetate of soda, a very little pure soda, and animal matter only soluble in water, but which is not gelatine.—The *crystalline lens* contains the same salts, and 36 per cent. of a peculiar animal matter, very similar to albumen.

Perspiration—Consists principally of water, along with muriate of soda, and free acetic acid. It has an acid reaction.

Pus.—This term is applied to several fluids secreted by abscesses and ulcers. It is called *healthy pus*, when afforded by a healing sore; and is then of the consistence and colour of cream, and is without smell. It appears an homogeneous fluid to the naked eye, but under the microscope, exhibits the appearance of minute globules floating in a transparent fluid. Its specific gravity is about 1.03. It is insoluble in water, and alcohol, and is little affected by dilute acids. It is dissolved by strong sulphuric, nitric, and muriatic acids; and by diluting the solution with water, the pus is again precipitated. It does not affect the colour of test paper, till it has been some time exposed to the air, when it becomes acid. As the secretion from mucous surfaces in some forms of disease becomes opaque, and assumes the appearance of pus, especially in diseases of the lungs, it is desirable to distinguish these fluids from each other. Mr. C. Darwin has given the following distinguishing marks: When pus and mucus are dissolved in sulphuric acid, and the solution is diluted, the pus subsides to the bottom, while the mucus remains suspended in the water. When pus and catarrhal mucus are diffused through water, the pus sinks, but the mucus floats. Pus is precipitated from its solution in potash by adding water; but the solution of mucus in potash is not affected by the addition of water. There are, also, other tests to distinguish these fluids from each other. Pus, as secreted by an unhealthy ulcer, is thin, transparent, of an acrid nature, and of a fœtid ichor.

Urine.—This fluid, which is constantly prone to vary in the proportion as well as number of its constituents, appears to be designed for carrying off those substances from the body which are superfluous, and which either abound with azote, or are of a saline nature. The quality of the urine must, of course, be materially influenced by the nature of the liquids taken into the stomach. Its specific gravity varies from 1.005 to 1.040. The average is about 1.020. Healthy urine, when first voided, emits a pleasant aromatic odour, and is transparent; but after standing some hours, an insoluble, cloudy matter, is deposited, which consists of mucus from the urinary passages, and (according to Dr. Prout) super-urate of ammonia, that salt being more soluble in warm than in cold water. Urine soon undergoes the putrefactive process, and gives off a very offensive odour. The change is principally owing to the tendency of urea to become decomposed by the other constituents of urine. The analysis of urine by Berzelius, is that which is now generally quoted. It is as follows :—

Water	933.00
Urea	30.10
Sulphate of potash	3.71
Sulphate of soda	3.16
Phosphate of soda	2.94
Phosphate of ammonia	1.65
Muriate of soda	4.45
Muriate of ammonia	1.50
Free lactic acid; Lactate of ammonia; Animal matter soluble in alcohol; Urea not separable from the preceding	17.14
Earthy phosphates, with a trace of fluate of lime	1.00
Uric acid	1.00
Mucus of the bladder	0.32
Silica	0 03
	1000.00

There is, however, great diversity of opinion respecting the composition of urine, some substances being named by other chemists, which are not included in a free state in the above list, such as sulphur and phosphorus. Dr. Turner says, " that notwithstanding the high authority of Berzelius, it is very doubtful if any free acid * be present in healthy urine.

* The presence of carbonic acid is shewn, by placing a vessel containing recent urine under the receiver of an air-pump. On exhausting the receiver, the carbonic acid escapes with effervescence. The quantity of carbonic acid is extremely variable.

Dr. Prout, with every appearance of justice, maintains that the acidity of recent urine, is occasioned by super-salts, and not by uncombined acid. He is of opinion that the acid reaction is chiefly, if not wholly, to be ascribed to the super-phosphate of lime, and super-urate of ammonia, salts which he finds may co-exist in a liquid without mutual decomposition. A very strong argument, which to me, indeed, appears conclusive, in favour of this view, is derived from the fact, that on adding muriatic acid to recent urine, minute crystals of uric acid are gradually deposited, as always happens when this acid subsides slowly from a state of solution; but, on the contrary, if no free acid is added, an amorphous sediment, which Dr. Prout regards as superurate of ammonia, is obtained."

It has been already stated, page 352, that a peculiar kind of saccharine matter is secreted in the urine of *diabetic* patients. The urine is also altered in spinal diseases, when the nerves supplying the kidneys become affected. And sometimes certain depositions take place in this fluid, when some of its components are secreted in excess, giving rise to the formation of *sand* or *gravel*, and *calculi*.*

The following condensed account of these depositions we take the liberty of extracting from Mr. Brande's "Manual of Chemistry:"—

"Sand is either *white* or *red;* the former consists of phosphate of lime, and ammoniaco-magnesian phosphate, either separate or mixed, and the latter is chiefly uric acid. The former deposition is prevented by the use of acids, and the latter by alkalies, and the alkaline earths. See the Note following *Liquor Potassæ,* page 98.

"Urinary calculi are, for the most part, composed of

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* Scheele was the first to investigate the nature of urinary calculi. Since his time, the subject has been pursued by Pearson, Wollaston, Henry, Brande, Prout, and Marcet in this country, and by Fourcroy, Vauquelin, Magendie, &c. in France.

materials that exist at all times in the urine, though there are a few substances that only make their occasional appearance in them. The following are their component ingredients:

Uric or lithic acid.
Urate of ammonia.
Phosphate of lime.
Ammonio-magnesian phosphate.
Oxalate of lime.
Cystic oxide.
Carbonate of lime.
Silica.

"The calculi composed of *uric acid* are of a brown or fawn colour; and, when cut through, appear of a more or less distinctly laminated texture. Their surface is generally smooth, or nearly so, being sometimes slightly tuberculated. Before the blow-pipe, this calculus blackens, and gives out a peculiar ammoniacal odour, leaving a minute portion of white ash; it is soluble in solution of pure potash, and heated with a little nitric acid, affords a fine pink compound, which is purpurate of ammonia.

"*Phosphate of lime calculus* is of a pale-brown, or grey colour, smooth, and made up of regular and easily separable laminæ. It is easily soluble in muriatic acid, and precipitated by pure ammonia, and does not fuse before the blow-pipe. *Calculi from the prostate gland*, are always composed of phosphate of lime.

"The *ammonio-magnesian*, or *triple calculus*, is generally white, or pale-grey, and the surface often presents minute crystals; its texture is generally compact, and often somewhat hard and translucent; heated violently by the blow-pipe, it exhales ammonia, and leaves phosphate of magnesia. It is more easily soluble than the preceding, and oxalate of ammonia forms no precipitate in its muriatic solution.

"It frequently happens that calculi consist of a mixture of the two last mentioned substances, in which case they melt before the blow-pipe, and are hence termed *fusible calculi.* They are white, or nearly so, and softer than the separate substances, often resembling chalk in appearance. They are easily soluble in muriatic acid, and if oxalate of ammonia be added to their solution, the lime is precipitated in the state of oxalate.

" *Oxalate of lime* forms calculi, the exterior colour of which is generally dark-brown, or reddish; they are commonly rough, or tuberculated upon the surface, and have hence been called *mulberry calculi.* Before the blow-pipe they blacken and swell, leaving a white infusible residue, which is easily recognised as quicklime. Small oxalate of lime calculi are, however, sometimes perfectly smooth upon the surface, and much resemble a hempseed in appearance.

" *Urate of ammonia* I admit among the urinary calculi upon the authority of Dr. Prout, my own experiments having formerly induced me to doubt its existence. Its surface is sometimes smooth, sometimes tuberculated; it is made up of concentric layers, and its fracture is fine earthy, resembling that of compact limestone; it is generally of a small size, and rather uncommon, though it often occurs mixed with uric acid. It usually decrepitates before the blow-pipe, is more soluble than the uric calculus, evolves ammonia when heated with solution of potash, and is readily soluble in the alkaline carbonates, which pure uric acid is not.

" *Cystic oxide* is a peculiar animal substance; the calculi composed of it, which are rare, are in appearance most like those of the ammonio-magnesian phosphate. They are soft, and when burned by the blow-pipe, exhale a peculiar fœtid odour. They are soluble in nitric, sulphuric, muriatic, phosphoric, and oxalic acids, and also in alkaline solutions.

" The substances which have been described, with the exception of carbonate of lime and cystic oxide, are sometimes intimately blended in calculi; sometimes they form alternating layers; and in a few cases four distinct layers have been observed, the nucleus being uric, upon which the oxalate, and phosphate of lime, and the triple phosphate, are distinctly and separately arranged.

"Dr. Marcet has described a calculus composed of a peculiar animal matter, which he calls *xanthic* * *oxide*, from its property of giving a yellow colour, when acted on by nitric acid: he has also announced the existence of calculus composed of *fibrin*.

"Dr. Prout and Mr. Smith have described calculi composed almost entirely of *carbonate of lime*, but this species is exceedingly rare, and among several hundred calculi which I have examined, I never met with it from the human bladder.

"*Silica*, as an ingredient in sand, and in some calculi, is very rare. It would appear from the statement of Mr. Venables, that it most commonly is voided in the form of sand."

§ 5 Of solid animal substances.

Bones, Shells, &c.—*Bones* consist of an earthy part, on which their firmness and strength depends, and of animal matter, which prevents them from being brittle. If a piece of bone be burnt in an open fire, the animal matter is driven off, and the earthy part remains, which is porous, and easily pulverulent. The products afforded by the destructive distillation of bones, or horns, have already been explained, at page 96. The soft parts of bone are *fat*, a peculiar kind of fat, termed *marrow*, *gelatine*, and *cartilage*. When fresh bone is digested in dilute muriatic acid, the fat, gelatine, and earthy parts, are removed, and pure cartilage, retaining the form of the bone, remains.

Human bones, according to Berzelius, are composed of—

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* From ξανθος, *yellow*.

Animal matter	33.3
Phosphate of lime	51.04
Carbonate of lime	11.30
Fluate of lime	2
Phosphate of magnesia	1.16
Soda, muriate of soda, and water	1.2
	100.00

Fourcroy and Vauquelin obtained from ox-bones—

Animal matter	51
Phosphate of lime	37.7
Carbonate of lime	10
Phosphate of magnesia	1.3
	100.0

The *enamel of teeth* differs from bone, in not containing cartilage. Mr. Pepys found it composed of—

Phosphate of lime	78
Carbonate of lime	6
Gelatine	16
	100

Ivory is of a similar nature to bone.

The *shells* of fish and other animals, and *pearls*, consist principally of carbonate of lime and animal matter. Sometimes phosphate of lime is also an ingredient. *Zoophites*, such as coral, sponge, &c , are similarly composed. In sponge, however, the animal matter is the prevailing ingredient.

The *tendons* and *membranes* in the different parts of the body, and the *cuticle*, are principally composed of gelatine.

Ligaments, *horn*, *nail*, *&c.* consist principally of albumen.

Hair, according to Mr. Hatchett, chiefly consists of a substance having the properties of coagulated albumen, along with gelatine: the latter abounds most in the softer kinds of hair. According to Vauquelin, hair also contains two kinds of oil; one white, existing in all kinds of hair; the other coloured, that obtained from red hair, being yellow, and that from dark hair of a darker colour. Sulphur, silica, iron, manganese, and carbonate and phosphate of lime are also found in hair. Nitrate of silver, and other metallic bodies, are capable of staining the hair, in consequence of the presence of sulphur.

Feathers, *quills*, *and wool*, are somewhat analogous to hair in composition.

MUSCLE is principally constituted of fibrin, but a variety of other substances are likewise present—namely, gelatine, albumen, fat, salts, and a peculiar animal extractive matter, called *osmazome*. The peculiar odour and taste of soup is owing to osmazome: this principle, when obtained in a separate state, is of a yellowish-brown colour, soluble in alcohol and water, both cold and boiling, and is not formed into a jelly by concentrating its solution by evaporation.

CEREBRAL SUBSTANCE, OR BRAIN, according to Vauquelin, consists of—

Water	80.00
White fatty matter	4.53
Red fatty matter	.70
Albumen	7.00
Osmazome	1.12
Phosphorus	1.50
Acids, salts, and sulphur	5.15
	100.00

The *pulp of nerves*, and *spinal marrow*, are similarly composed. The texture of these several substances differs from that of all other animal substances.

§ 6. ANIMAL PUTREFACTION.

As soon as the vital principle of animals is extinct, the different parts of the body soon evince a disposition to undergo the putrefactive process, during which water, ammonia, carbonic acid, sulphuretted, carburetted, and phosphuretted hydrogen, are generated by a new union of the different elements: the first of these escapes in the form of vapour, and the other compounds are liberated in a gaseous state. The same conditions are necessary to this as to vegetable putrefaction. In respect to temperature, that from 60° to 90° F. is the most favourable. The process does not take place at the freezing temperature, and hence animal matter may be preserved unchanged for a great length of time in a frozen state. Animal matter, in a perfectly dry state, may also be preserved for a considerable time without change.

ADEPS PRÆPARATA.

PREPARED LARD.

Concide Adipem in frustula, tum, liquefactam
Cut the Lard into small pieces, then, it being melted

leni igne, exprime per linteum.
with a slow fire, express through linen.

The composition and properties of the different varieties of fat have been already described. In preparing lard, the heat should not exceed the melting point of fat, 97° F. lest it become discoloured by a higher temperature. This is an useless formula, as the lard sold in bladders in the market is sufficiently pure for medical purposes. Lard is principally employed in forming ointments, &c.

CORNU USTUM.

BURNT (HARTS') HORN.

Ure frusta Cornuum igne aperto, donec
Burn pieces of (Hart's) Horns in an open fire, until

albescant penitùs; deinde contere, et
they become thoroughly whitened; then triturate, and

præpara eodem modo quo
prepare (them) in the same manner in which

præceptum est de Cretâ.
it is ordered concerning Chalk.

By burning harts' horn, the animal matter is dissipated, and the earthy part, which resembles that of bones, remains. This is an useless preparation, as the phosphate of lime, which constitutes the greater part of it, is insoluble in the stomach and inert, and therefore cannot act as an antacid as was formerly supposed. Neither does it appear at all calculated to be useful in cases of *mollities ossium*, in which disease it used to be employed for affording nourishment to the earthy part of the bones.

SEVUM PRÆPARATUM.

PREPARED SUET.

Concide Sevum in frustula; tum, liquefactum
Cut the Suet into small pieces; then, it being melted

leni igne, exprime per linteum.
with a gentle fire, express through linen.

The same observations respecting temperature as are made under *adeps præparata* apply in this case. Suet, like lard, is principally employed in ointments, &c.

SPONGIA USTA.

BURNT SPONGE.

Concide Spongiam in frustula, et contunde,
Cut the Sponge into small pieces, and beat (it),

ut separetur à rebus alienis
that it may be separated from foreign things

adhærentibus; tum ure in vase ferreo
adhering thereto; then burn (it) in an iron vessel

clauso, donec fiat nigra et friabilis; denique,
covered, until it become black and friable; lastly,

tere in pulverem subtilissimum.
rub (it) into a very fine powder.

By burning sponge, the animal matter is driven off, and *charcoal*, *phosphate* and *carbonate of lime*, *carbonate of soda*, and *iodine* remain.

Prop.—Deobstruent. Burnt sponge is an useful remedy in bronchocele, and scrofulous diseases: its virtues depend on the iodine.—Dose, ℈j. to ʒij. or more, made into an electuary with syrup or honey.

TESTÆ PRÆPARATÆ.

PREPARED SHELLS.

Lava Testas, priùs purgatas sordibus,
Wash the Shells, first cleansed from impurities,

aquâ fervente; tum præpara eodem modo
in boiling water; then prepare (them) in the same manner

quo præceptum est de Cretâ.
in which it is ordered concerning Chalk.

Shells only differ from chalk in containing a little animal matter; they might, therefore, very well have been omitted.—Dose, the same as that of chalk.

EMPLASTRA.

PLASTERS.

Plasters are solid, tenacious compounds, which adhere to the body by means of its ordinary temperature. They are either employed to defend wounds and sores from the atmosphere, and to give support to the parts; or as stimulants, and rubefacients.

EMPLASTRUM AMMONIACI.

PLASTER OF AMMONIAC.

Recipe Ammoniaci purificati uncias quinque;
Take of purified Ammoniac five ounces;

Acidi acetici diluti octarium dimidium;
of dilute acetic Acid half a pint;

Liqua Ammoniacum in Acido; dein consume
Dissolve the Ammoniac in the Acid; then evaporate

liquorem in vase ferreo, balneo aquoso; movens
the liquor in an iron vessel, in a water bath; stirring

assiduè, donec idonea crassitudo fiat.
constantly, until a proper consistence be made.

Prop.—Stimulant, resolvent. Useful as an application to scrophulous tumours, white swellings, &c. Dr. Paris says, "there is a peculiar disease of the knee, to which servant maids, who scour floors upon their knees, are liable, and for which this plaster is a specific."

EMPLASTRUM AMMONIACI CUM HYDRARGYRO.

PLASTER OF AMMONIAC WITH MERCURY.

Recipe Ammoniaci purificati libram;
Take of purified Ammoniac a pound;

Hydrargyri purificati uncias tres; Olei sulphurati
of purified Mercury three ounces; of sulphurated Oil

fluidrachmam;
a fluid-dram;

Tere Hydrargyrum cum Oleo sulphurato, donec
Rub the Mercury with the sulphurated Oil, until

globuli conspiciantur non ampliùs; deinde adjice
globules are seen no longer; then add

paulatim Ammoniacum liquefactum, et misce
gradually the melted Ammoniac, and mix

omnia.
the whole (together).

In the formation of this plaster, the mercury is converted into the state of protoxide.

Prop.—Discutient, resolvent. It may be applied with advantage to indurated glands and tumours, venereal nodes, &c.

EMPLASTRUM CANTHARIDIS.

PLASTER OF SPANISH FLY.

Recipe libram Cantharidis tritæ in pulverem sub-
Take a pound of Spanish Fly rubbed into a very fine

tilissimum; libram cum semisse Emplastri
powder; a pound and a half of the Plaster

Ceræ; libram dimidiam Adipis præparatæ;
of Wax; half a pound of prepared Lard;

Emplastro et Adipi liquefactis simul,
To the Plaster and Lard melted together,

et remotis ab igne, paulò antequam
and removed from the fire, a little before

concrescant, insperge Cantharidem atque
they become solid, sprinkle in the Spanish Fly and

misce omnia.
mix the whole (together).

This is the common and best application for exciting blisters. It ought never to be spread with a spatula that has been heated in the fire : if heat be at all necessary, that of hot water will be sufficient; but in general it is best spread with the thumb.

EMPLASTRUM CERÆ.

PLASTER OF WAX.

Recipe Ceræ flavæ, Sevi præparati, singulorum
Take of yellow Wax, of prepared Suet, of each

libras tres; Resinæ flavæ libram;
three pounds; of yellow Resin a pound;

Liquefac simul, et cola.
Melt (them) together, and strain.

This plaster used formerly to be employed for exciting a discharge from a blistered surface; but on account of its being too stimulating, it is no longer used for that purpose.

Off. Prep.—*Emplastrum Cantharidis.*

EMPLASTRUM CUMINI.

PLASTER OF CUMIN (SEEDS).

Recipe Seminum Cumini, Seminum Carui,
Take of the Seeds of Cumin, of the Seeds of Carraway,

Baccarum Lauri, singulorum uncias tres;
(and) of Berries of Bay, of each three ounces;

Picis abietinæ libras tres; Ceræ flavæ
of Burgundy Pitch three pounds; of yellow Wax

uncias tres; Olei Olivæ, Aquæ,
three ounces; of Oil of Olive, (and) of Water,

singulorum fluidunciam cum semisse;
of each a fluid-ounce and a half;

Pici et Ceræ liquefactis simul adjice
To the Pitch and Wax melted together add

arida, trita in pulverem, Oleum
the dried (ingredients), rubbed into a powder, the Oil

Olivæ, et Aquam; tum decoque ad idoneam
of Olive, and the Water; then boil down to a proper

crassitudinem.
consistence.

Prop.—Stimulant, discutient. It may be usefully applied over the region of the stomach in flatulence, and to indolent tumours, &c.

EMPLASTRUM GALBANI COMPOSITUM.

COMPOUND PLASTER OF GALBANUM.

Recipe Gummi-Resinæ Galbani purificatæ
Take of Gum-resin of Galbanum purified

uncias octo ; Emplastri Plumbi libras tres ;
eight ounces ; of Plaster of Lead three pounds ;

Terebinthinæ vulgaris drachmas decem ; Resinæ
of common Turpentine ten drams ; of Resin

Abietis, contritæ uncias tres ;
of the Spruce Fir powdered three ounces ;

Gummi-Resinæ Galbani et Terebinthinæ,
To the Gum-resin of Galbanum and Turpentine,

liquefactis simul, adjice primò Resinam
melted together, add first the Resin

Abietis, deinde Emplastrum Plumbi,
of the Spruce Fir, then the Plaster of Lead,

liquefactum lento igne, atque misce
melted with a slow fire, and mix

omnia.
the whole (together).

Prop.—Stimulant, suppurative. An useful application to scrofulous tumours, to joints affected with fixed pains, &c. &c.

EMPLASTRUM HYDRARGYRI.

PLASTER OF MERCURY.

Recipe Hydrargyri purificati uncias tres ;
Take of purified Mercury three ounces ;

Olei sulphurati fluidrachmam ; Emplastri Plumbi
of sulphurated Oil a fluid-dram ; of Plaster of Lead

libram ;
a pound ;

Tere Hydrargyrum cum Oleo sulphurato, donec
Rub the Mercury with the sulphurated Oil, until

globuli conspiciantur non ampliùs; tum adjice
globules are seen no longer; then add

paulatim Emplastrum Plumbi liquefactum, atque misce
gradually the Plaster of Lead melted, and mix

omnia.
the whole (together.)

In making this plaster, the mercury is converted into the state of protoxide.

Prop.—Alterative, discutient. The *Empl. Ammoniac. cum Hydrarg.* is preferable, on account of the ammoniacum in that plaster assisting the action of the mercury.

EMPLASTRUM OPII.

PLASTER OF OPIUM.

Recipe Opii duri contriti unciam dimidiam;
Take of hard Opium powdered half an ounce;

Resinæ Abietis contritæ uncias tres;
of Resin of the Spruce Fir powdered three ounces;

Emplastri Plumbi libram; Aquæ
of Plaster of Lead a pound; of Water

octarium dimidium;
half a pint;

Emplastro liquefacto adjice Resinam
To the melted Plaster add the Resin

Abietis, Opium, et Aquam, et
of the Spruce Fir, the Opium, and the Water, and

decoque, lento igne, donec omnia cöeant
boil down, with a slow fire, until the whole unite

in crassitudinem emplastri.
into the consistence of plaster.

Said to be anodyne; but opium, in form of tincture, united with oil, forms a better application as a local anodyne.

EMPLASTRUM PICIS COMPOSITUM.

COMPOUND PLASTER OF PITCH.

Recipe Picis abietinæ libras duas; Resinæ
Take of Burgundy Pitch two pounds; of Resin

Abietis libram; Resinæ flavæ,
of the Spruce Fir a pound; of yellow Resin,

Ceræ flavæ, singulorum uncias quatuor;
(and) of yellow Wax, of each four ounces;

Olei expressi Myristicæ unciam; Olei
of the expressed Oil of Nutmeg an ounce; of Oil

Olivæ, Aquæ, singulorum fluiduncias duas;
of Olive, (and) of Water, of each two fluid-ounces;

Pici, Resinæ, et Ceræ, liquefactis
To the Pitch, Resin, and Wax, melted

simul, adjice primùm Resinam Abietis, dein
together, add first the Resin of the Spruce Fir, then

Oleum Myristicæ, Oleum Olivæ, et Aquam.
the Oil of Nutmeg, the Oil of Olive, and the Water.

Denique, misce omnia, et decoque ad idoneam
Lastly, mix the whole, and boil down to a proper

crassitudinem.
consistence.

Prop. — Stimulant, rubefacient. Employed as a counter-irritant in some pulmonary affections.

EMPLASTRUM PLUMBI.

PLASTER OF LEAD.

Recipe Oxydi semivitrei Plumbi, triti
Take of the semivitreous Oxide of Lead, rubbed

in pulverem subtilissimum, libras quinque; Olei
into a very fine powder, five pounds; of Oil

Olivæ congium; Aquæ octarios duos;
of Olive a gallon; of Water two pints;

Coque simul lengo igne, assiduè
Boil (them) together with a slow fire, constantly

movens, donec Oleum et Oxydum Plumbi cöeant
stirring, until the Oil and the Oxide of Lead unite

in crassitudinem Emplastri. Autem
into the consistence of a Plaster. But

oportebit adjicere paululum Aquæ ferventis,
it will be necessary to add a little boiling Water,

si ferè omnis ea quæ adhibita est in principio
if almost all that which is employed in the beginning

absumpta fuerit, ante finem coctionis.
shall be evaporated, before the end of the boiling.

Chiefly employed for defending excoriated parts from the atmosphere, and for bringing the edges of recent wounds into a state of apposition. It forms the basis of the following plasters:—*Empl. Hydrargyri; Empl. Opii; Empl. Galbani C.; Empl. Resinæ; Empl. Saponis.*

EMPLASTRUM RESINÆ.

PLASTER OF RESIN.

Recipe Resinæ flavæ libram dimidiam; Emplastri
Take of yellow Resin half a pound; of Plaster

Plumbi libras tres;
of Lead three pounds;

Emplastro Plumbi liquefacto lento igne,
To the Plaster of Lead melted with a slow fire,

adjice Resinam contritam, et misce.
add the powdered Resin, and mix.

This is employed for the same purposes as the preceding; the resin renders it gently stimulant.

EMPLASTRUM SAPONIS.

PLASTER OF SOAP.

Recipe Saponis duri concisi libram dimidiam;
Take of hard Soap sliced half a pound;

Emplastri Plumbi libras tres;
of Plaster of Lead three pounds;

Emplastro liquefacto admisce Saponem; tum
To the melted Plaster mix the Soap; then

decoque ad idoneam crassitudinem.
boil down to a proper consistence.

Used in the same cases as the *Empl. Hydrarg.*, but not so useful.

CERATA.

CERATES.

The consistence of these compounds is owing to the wax they contain; hence their name. Their firmness is between that of plasters and ointments.

CERATUM CALAMINÆ.

CERATE OF CALAMINE.

Recipe Calaminæ præparatæ, Ceræ flavæ,
Take of prepared Calamine, (and) of yellow Wax,

singulorum libram dimidiam; Olei Olivæ
of each half a pound; of Oil of Olive

octarium;
a pint;

Misce Oleum cum Cerâ liquefactâ; tum
Mix the Oil with the melted Wax; then

remove ab igne, et, ubi primùm
remove (them) from the fire, and, when first

lentescant, adjice Calaminam, et assiduè
they begin to thicken, add the Calamine, and constantly

move, donec refrixerint.
stir, until they shall have cooled.

Vulgarly called *Turner's cerate.*

Prop.—Desiccative, epulotic. Applied to excoriations and ulcers, and to burns and scalds, &c., when the inflammation is abated.

CERATUM CANTHARIDIS.

CERATE OF SPANISH FLY.

Recipe Cantharidis, tritæ in pulverem subtilissimum,
Take of Spanish Fly, rubbed into a very fine powder,

drachmam; Cerati Cetacei drachmas sex;
a dram; of Cerate of Spermaceti six drams;

Cerato, emollito igne, adjice
To the Cerate, softened with the fire, add

Cantharidem, et misce.
the Spanish Fly, and mix.

Used for the purpose of keeping blisters open. Some constitutions cannot bear it of the above strength: in such cases, it may be reduced by adding more of the spermaceti cerate.

CERATUM CETACEI.

CERATE OF SPERMACETI.

Recipe Cetacei, unciam dimidiam; Ceræ albæ
Take of Spermaceti half an ounce; of white Wax

uncias duas; Olei Olivæ fluiduncias quatuor;
two ounces; of Oil of Olive four fluid-ounces;

Adjice Oleum Cetaceo et Ceræ, liquefactis
Add the Oil to the Spermaceti and Wax, melted

simul, et move spathâ ligneâ donec
together, and stir with a wooden spatula until

refrixerint.
they shall have cooled.

An useful emollient, and cooling dressing for blisters, &c.

OFF. PREP.—*Ceratum Cantharidis.*

CERATUM PLUMBI ACETATIS.

CERATE OF THE ACETATE OF LEAD.

Recipe Acetatis Plumbi contritæ drachmas duas;
Take of the Acetate of Lead powdered two drams;

Ceræ albæ uncias duas; Olei Olivæ
of white Wax two ounces; of Oil of Olive

octarium dimidium;
half a pint;

Liqua Ceram in fluiduncias septem Olei;
Dissolve the Wax in seven fluid-ounces of the Oil;

tum his adjice paulatim Acetatem Plumbi,
then to these add gradually the Acetate of Lead,

contritam separatim cum reliquo Oleo, et
rubbed separately with the remaining Oil, and

move spathâ ligneâ, donec
stir (them) with a wooden spatula, until

cöierint.
they shall have united.

Prop.—Cooling, astringent. Used as a dressing for burns, inflamed sores, and excoriated surfaces.

CERATUM PLUMBI COMPOSITUM.

COMPOUND CERATE OF LEAD.

Recipe Liquoris Subacetatis Plumbi
Take of the Solution of the Subacetate of Lead

fluiduncias duas cum semisse; Ceræ flavæ
two fluid-ounces and a half; of yellow Wax

uncias quatuor; Olei Olivæ fluiduncias novem;
four ounces; of Oil of Olive nine fluid-ounces;

Camphoræ drachmam dimidiam;
of Camphor half a dram;

Misce Ceram liquefactam cum fluidunciis octo
Mix the melted Wax with eight fluid-ounces

Olei; tum remove ab igne, et, ubi
of the Oil; then remove (them) from the fire, and, when

primùm lentescant, adjice paulatim Liquorem
first they begin to thicken, add gradually the Solution

Subacetatis Plumbi, et move assiduè
of the Subacetate of Lead, and stir constantly

spathâ ligneâ, donec refrixerint.
with a wooden spatula, until they shall have cooled.

Denique, cum his misce Camphoram, liquatam
Lastly, with these mix the Camphor, dissolved

in reliquo Oleo.
in the remaining Oil.

An emollient, cooling dressing for burns, inflamed sores, and excoriations, and of extensive service in chronic ophthalmia of the tarsus.

CERATUM RESINÆ.

CERATE OF RESIN.

Recipe Resinæ flavæ, Ceræ flavæ, singulorum
Take of yellow Resin, (and) of yellow Wax, of each

libram; Olei Olivæ octarium;
a pound; of Oil of Olive a pint;

Liquefac Resinam et Ceram simul
Melt the Resin and the Wax together

lento igne; dein adjice Oleum, et exprime
with a slow fire; then add the Oil, and express

Ceratum adhuc calens per linteum.
the Cerate whilst yet hot through linen.

An useful stimulant and digestive for cleansing ulcerated, indolent sores.

OFF. PREP.—*Linimentum Terebinthinæ.*

CERATUM SABINÆ.

CERATE OF SAVINE.

Recipe Foliorum recentium Sabinæ contusorum
Take of fresh Leaves of Savine bruised

libram; Ceræ flavæ libram dimidiam;
a pound; of yellow Wax half a pound;

Adipis præparatæ libras duas;
of prepared Lard two pounds;

Incoque Folia Sabinæ Adipi et Ceræ
Boil the Leaves of Savine in the Lard and Wax

liquefactis simul; tum exprime per linteum.
melted together; then express through linen.

In those cases where it is necessary to keep blisters discharging, this is an useful dressing, as it operates without producing the irritation attending the application of the *Ceratum Cantharidis.* It is not only necessary to have this preparation well made from the *fresh* leaves, but it must be also carefully preserved from the air, otherwise it will soon lose its strength.

CERATUM SAPONIS.

CERATE OF SOAP.

Recipe Saponis duri uncias octo; Ceræ flavæ
Take of hard Soap eight ounces; of yellow Wax

uncias decem; Oxydi semivitrei Plumbi
ten ounces; of the semivitreous Oxide of Lead

contriti libram; Olei Olivæ octarium;
powdered a pound; of Oil of Olive a pint;

Aceti congium;
of Vinegar a gallon;

Coque Acetum cum Oxydo Plumbi,
Boil the Vinegar with the Oxide of Lead,

lento igne, assiduè movens, donec cöeant
with a slow fire, constantly stirring, until they unite

in unum; dein adjice Saponem, et coque iterùm
into one; then add the Soap, and boil again

simili modo, donec humor consumptus fuerit
in a similar manner, until the moisture be evaporated

penitùs; denique, cum his misce Ceram, priùs
thoroughly; lastly, with these mix the Wax, first

liquefactam ex Oleo.
dissolved in the Oil.

Resolvent, when applied to scrofulous enlargements. This cerate, also, spread upon linen, is applied round the fracture of a limb; but it ought on no account to be used before the inflammation and swelling have subsided, and the bones have become united.

CERATUM SIMPLEX.

SIMPLE CERATE.

Recipe Olei Olivæ fluiduncias quatuor;
Take of Oil of Olive four fluid-ounces;

Ceræ flavæ uncias quatuor;
of yellow Wax four ounces;

Adjice Oleum Ceræ liquefactæ, et misce.
Add the Oil to the melted Wax, and mix.

An emollient, and cooling dressing for sores and excoriated parts.

UNGUENTA.

OINTMENTS.

Ointments are similar compounds to cerates, but their consistence is not so firm. They are often the vehicles of active remedies.

UNGUENTUM CANTHARIDIS.

OINTMENT OF SPANISH FLY.

Recipe Cantharidis contritæ
Take of Spanish Fly rubbed

in pulverem subtilissimum uncias duas;
into a very fine powder two ounces;

Aquæ destillatæ fluiduncias octo; Cerati
of distilled Water eight fluid-ounces; of Cerate

Resinæ uncias octo;
of Resin eight ounces;

Decoque Aquam cum Cantharide
Boil down the Water with the Spanish Fly

ad dimidium, et cola; Liquori colato
to half, and strain; to the strained Liquor

immisce Ceratum; dein vaporet ad idoneam
mix in the Cerate; then let it evaporate to a proper

crassitudinem.
consistence.

This is not so useful an application for keeping open a blistered surface as the *Ceratum Cantharidis*, on account of the heat employed for evaporating the water destroying the acrimony of the flies.

UNGUENTUM CETACEI.

OINTMENT OF SPERMACETI.

Recipe Cetacei drachmas sex; Ceræ albæ
Take of Spermaceti six drams; of white Wax

drachmas duas; Olei Olivæ fluiduncias tres;
two drams; of Oil of Olive three fluid-ounces;

Liquefacta simul lento igne, move
Being melted together with a slow fire, stir (them)

assiduè donec refrixerint.
constantly until they shall have cooled.

This is the ordinary dressing for healing blisters, and excoriated surfaces.

UNGUENTUM ELEMI COMPOSITUM.

COMPOUND OINTMENT OF ELEMI.

Recipe Elemi libram; Terebinthinæ vulgaris
Take of Elemi a pound; of common Turpentine

uncias decem; Sevi præparati libras duas; Olei
ten ounces; of prepared Suet two pounds; of Oil

Olivæ fluiduncias duas;
of Olive two fluid-ounces;

Liquefac Elemi simul cum Sevo; tum
Melt the Elemi together with the Suet; then

remove ab igne, et his misce
remove (them) from the fire, and to these mix

statim Terebinthinam et Oleum; deinde
immediately the Turpentine and the Oil; then

exprime per linteum.
express through linen.

Prop.—Stimulant and digestive. Used for keeping open issues and setons, and for dressing wounds which, from their situation, will not admit of the application of adhesive straps. It is an excellent dressing for chilblains.

UNGUENTUM HYDRARGYRI FORTIUS.

THE STRONGER OINTMENT OF MERCURY.

Recipe Hydrargyri purificati libras duas;
Take of purified Mercury two pounds;

Adipis præparatæ uncias viginti tres;
of prepared Lard twenty-three ounces;

Sevi præparati unciam;
of prepared Suet an ounce;

Tere primùm Hydrargyrum cum Sevo et exiguo
Rub first the Mercury with the Suet and a little

Adipis, donec globuli conspiciantur non ampliùs;
of the Lard, until globules are seen no longer;

dein	adjice	quod	reliquum est	Adipis, et
then	*add*	*that which is left*		*of the Lard, and*

misce.
mix.

The mercury absorbs oxygen during trituration with the fat, and is converted partly into protoxide, while a portion of it is only mechanically divided. Two drams of the ointment contain one dram of mercury.

When it is necessary to introduce mercury into the system, ʒj of this ointment may be rubbed on any part of the body where the skin is thin, as in the inner part of the thighs, every night and morning until the desired effect be produced. The operation should be continued until the ointment entirely disappears, and should be performed by the patient himself. Friction with this ointment is also applied over the region of the part affected in chronic hepatitis, disease of the mesenteric glands, &c. The introduction of mercury into the system by means of friction is preferable to giving it by the mouth, as its effects are more speedy, and the stomach is not thereby affected. The unpleasantness of the operation of *rubbing in*, as it is called, is the chief objection to this form of applying the remedy.

UNGUENTUM HYDRARGYRI MITIUS.

THE MILDER OINTMENT OF MERCURY.

Recipe Unguenti fortioris Hydrargyri libram;
Take of the stronger Ointment of Mercury a pound;

Adipis præparatæ libras duas;
of prepared Lard two pounds;

Misce.
Mix.

Six drams of this ointment contain one dram of mercury.

This is much milder than the former preparation, and is chiefly employed as a dressing for venereal sores, and for exterminating pediculi.

UNGUENTUM HYDRARGYRI NITRATIS.

OINTMENT OF NITRATE OF MERCURY.

Recipe Hydrargyri purificati unciam; Acidi nitrici
Take of purified Mercury an ounce; of nitric Acid

fluidrachmas undecim; Adipis præparatæ
eleven fluid-drams; of prepared Lard

uncias sex; Olei Olivæ fluiduncias quatuor;
six ounces; of Oil of Olive four fluid-ounces;

Primùm liqua Hydrargyrum in Acido; dein
First dissolve the Mercury in the Acid; then

misce liquorem adhuc calentem cum Adipe
mix the liquor whilst yet hot with the Lard

et Oleo liquefactis simul.
and the Oil melted together.

See note under *Hydrargyri Nitrico-oxydum*, page 149.

PROP.—Stimulant, detergent, alterative. When diluted with simple ointment it forms a useful dressing for herpetic eruptions, and ulcerations of the tarsi: in the latter case, a little put on the end of the finger, and warmed at the flame of a candle, may be applied along the inner part of the eye-lids.

UNGUENTUM HYDRARGYRI NITRICO-OXYDI.

OINTMENT OF NITRIC-OXIDE OF MERCURY.

Recipe Nitrico-oxydi Hydrargyri unciam;
Take of Nitric-oxide of Mercury an ounce;

Ceræ albæ uncias duas; Adipis præparatæ
of white Wax two ounces; of prepared Lard

uncias sex;
six ounces;

Adjice Nitrico-oxydum Hydrargyri, tritum
Add the Nitric-oxide of Mercury, rubbed

in pulverem subtilissimum, Ceræ et Adipi
into a very fine powder, to the Wax and Lard

liquefactis simul, et misce.
melted together, and mix.

This forms an excellent stimulant application for indolent ulcers. When mixed with any ointment containing resin, its red colour becomes changed, passing through different shades of green to black, in consequence of the peroxide of mercury being converted into protoxide.

UNGUENTUM HYDRARGYRI PRÆCIPITATI ALBI.

OINTMENT OF WHITE PRECIPITATE OF MERCURY.

Recipe præcipitati albi Hydrargyri drachmam;
Take of white precipitate of Mercury a dram;

Adipis præparatæ unciam cum semisse;
of prepared Lard an ounce and a half;

Adjice Hydrargyrum præcipitatum Adipi,
Add the precipitated Mercury to the Lard,

liquefactæ lento igne, et misce.
melted with a slow fire, and mix.

Prop.—Stimulant, detergent. It is employed for curing the itch, and for exterminating pediculi.

UNGUENTUM PICIS NIGRÆ.

OINTMENT OF BLACK PITCH.

Recipe Picis nigræ, Ceræ flavæ, Resinæ flavæ,
Take of black Pitch, of yellow Wax, of yellow Resin,

singulorum uncias novem; Olei Olivæ octarium;
of each nine ounces; of Oil of Olive a pint;

Liquefac simul, et exprime per linteum.
Melt (them) together, and express through linen.

Prop—Digestive, stimulant.

UNGUENTUM PICIS LIQUIDÆ.

OINTMENT OF LIQUID PITCH.

Recipe Picis liquidæ, Sevi præparati,
Take of liquid Pitch, (and) of prepared Suet,*

singulorum libram;
of each a pound;

Liquefac simul, et exprime per linteum,
Melt (them) together, and express through cloth.

This may be employed very successfully as a detergent in scabby eruptions, and tinea capitis.

UNGUENTUM SAMBUCI.

OINTMENT (OF FLOWERS) OF ELDER.

Recipe Florum Sambuci, Adipis præparatæ
Take of Flowers of Elder, and of prepared Lard

singulorum libras duas;
of each two pounds;

---

* Tar.

Incoque Flores Sambuci Adipi, donec
Boil the Flowers of Elder in the Lard, until

fiant friabiles; tum exprime per linteum.
they become friable; then express through linen.

This is a redundant preparation, as it is in no respect superior to simple ointment.

UNGUENTUM SULPHURIS.

OINTMENT OF SULPHUR.

Recipe Sulphuris sublimati uncias tres;
Take of sublimed Sulphur three ounces;

Adipis præparatæ libram dimidiam;
of prepared Lard half a pound;

Misce.
Mix.

This is the common specific in itch.

UNGUENTUM SULPHURIS COMPOSITUM.

COMPOUND OINTMENT OF SULPHUR.

Recipe Sulphuris sublimati libram dimidiam; Radicis
Take of sublimed Sulphur half a pound; of Root

Veratri contritæ uncias duas; Nitratis
of white Hellebore powdered two ounces; of Nitrate

Potassæ drachmam; Saponis mollis
of Potash a dram; of soft Soap

libram dimidiam; Adipis præparatæ libram
half a pound; of prepared Lard a pound

cum semisse;
and a half;

Misce.
Mix.

Employed for the same purpose as the former; but the white hellebore renders it too irritating for some skins.

UNGUENTUM VERATRI.

OINTMENT OF WHITE HELLEBORE.

Recipe	Radicis	Veratri	contritæ
Take	*of the Root*	*of white Hellebore*	*powdered*

uncias duas; Adipis præparatæ uncias octo; Olei
two ounces; of prepared Lard eight ounces; of Oil

Limonum minima viginti;
of Lemons twenty minims;

Misce.
Mix.

This is used for curing the itch, when the smell of sulphur is objectionable; but it is not so certain in its action as the sulphur ointment.

UNGUENTUM ZINCI.

OINTMENT OF ZINC.

Recipe	Oxydi	Zinci	unciam;
Take	*of the Oxide*	*of Zinc*	*an ounce;*

Adipis præparatæ uncias sex;
of prepared Lard six ounces;

Misce.
Mix.

Astringent and stimulant. It is employed in chronic ophthalmia, depending on a relaxed state of the vessels, and may be smeared on the tarsi every night. Dr. A. T. Thomson has found it of considerable use in sore nipples; and for removing ring-worm, particularly when it attacks the scalp.

LINIMENTA.

LINIMENTS.

Liniments are of an oily consistence, and are in general more active than the two preceding classes of preparations.

LINIMENTUM ÆRUGINIS.

LINIMENT OF VERDIGRIS.

Recipe Æruginis contritæ unciam; Aceti
Take of Verdigris powdered an ounce; of Vinegar

fluiduncias septem; Mellis despumati
seven fluid-ounces; of Honey clarified

uncias quatuordecim;
fourteen ounces;

Liqua Æruginem in Aceto, et cola
Dissolve the Verdigris in the Vinegar, and strain

per linteum; dein, instillato Melle,
through linen; then, the Honey being dropped in,

decoque ad idoneam crassitudinem.
boil down to a proper consistence.

This preparation, which cannot be properly called a liniment, is escharotic, and may be employed for reducing fungous granulations. When diluted sufficiently, it is an useful stimulant and detergent for foul ulcers. In a diluted state, it is also applied as a gargle in venereal ulcerations of the throat; but its use in this way is not to be recommended.

LINIMENTUM AMMONIÆ FORTIUS.

STRONGER LINIMENT OF AMMONIA.

Recipe fluidunciam Liquoris Ammoniæ;
Take a fluid-ounce of the Solution of Ammonia;

fluiduncias duas Olei Olivæ;
two fluid-ounces of Oil of Olive;

Agita simul donec misceantur.
Shake (them) together until they become mixed.

The alkali and oil acting upon each other give rise to a soap, which is held in a state of solution by the water of the *liquor ammoniæ.*

This forms a very useful rubefacient in a number of affections requiring such remedies.

LINIMENTUM AMMONIÆ SUBCARBONATIS.

LINIMENT OF THE SUBCARBONATE OF AMMONIA.

Recipe Liquoris Subcarbonatis Ammoniæ
Take of the Solution of the Subcarbonate of Ammonia

fluidunciam; Olei Olivæ fluiduncias tres;
a fluid-ounce; of Oil of Olive three fluid-ounces;

Agita simul donec misceantur.
Shake (them) together until they become mixed.

The carbonic acid prevents the formation of a perfect soap, and therefore, unlike the preceding preparation, the soapy matter is deposited on standing. The use of this liniment is like that of the former, but it is not so strong in its effects.

LINIMENTUM CAMPHORÆ.

LINIMENT OF CAMPHOR.

Recipe Camphoræ unciam dimidiam; Olei Olivæ
Take of Camphor half an ounce; of Oil of Olive

fluiduncias duas;
two fluid-ounces;

Liqua Camphoram in Oleo.
Dissolve the Camphor in the Oil.

An useful application for sprains, bruises, &c.

LINIMENTUM CAMPHORÆ COMPOSITUM.

COMPOUND LINIMENT OF CAMPHOR.

Recipe Camphoræ uncias duas; Liquoris Ammoniæ
Take of Camphor two ounces; of Solution of Ammonia

fluiduncias sex; Spiritûs Lavandulæ octarium;
six fluid-ounces; of Spirit of Lavender a pint;

Misce Liquorem Ammoniæ cum Spiritu; tum,
Mix the Solution of Ammonia with the Spirit; then,

destillet octarius ex retortâ vitreâ, lento igne;
let a pint distil from a glass retort, with a slow fire;

denique, liqua Camphoram in hoc.
lastly, dissolve the Camphor in this.

This may be employed in the same cases as the former, but it is much stronger.

LINIMENTUM HYDRARGYRI.

LINIMENT OF MERCURY.

Recipe Unguenti fortioris Hydrargyri,
Take of the stronger Ointment of Mercury,

Adipis præparatæ, singulorum uncias quatuor;
(*and of prepared Lard, of each four ounces;*

Camphoræ unciam; Spiritûs rectificati
of Camphor an ounce; of rectified Spirit

minima quindecim; Liquoris Ammoniæ
fifteen minims; of the Solution of Ammonia

fluiduncias quatuor;
four fluid-ounces;

Primùm tere Camphoram cum Spiritu, deinde
First rub the Camphor with the Spirit, then

cum Adipe et Unguento Hydrargyri; denique,
with the Lard and Ointment of Mercury; lastly,

Liquore Ammoniæ instillato
the Solution of Ammonia being dropped in

paulatim, misce omnia.
by little and little, mix the whole (together).

Stimulant and discutient. It is an useful application for venereal nodes, &c., and indolent swellings. It affects the mouth sooner than the strong mercurial ointment, the action of the mercury being assisted by the ammonia and camphor.

LINIMENTUM SAPONIS COMPOSITUM.

COMPOUND LINIMENT OF SOAP.

Recipe Saponis duri uncias tres; Camphoræ
Take of hard Soap three ounces; of Camphor

unciam; Spiritûs Rosmarini octarium;
an ounce; of Spirit of Rosemary a pint;

Liqua Camphoram in Spiritu; dein adjice
Dissolve the Camphor in the Spirit; then add

Saponem, et macera balneo arenæ, donec
the Soap, and macerate in a bath of sand, until

liquetur.
it be dissolved.

This preparation is employed as an anodyne and stimulant, and is a very useful application for local pains and bruises. Its anodyne properties may be increased by the addition of tincture of opium.

LINIMENTUM TEREBINTHINÆ.

LINIMENT OF TURPENTINE.

Recipe Cerati Resinæ libram; Olei
Take of Cerate of Resin a pound; of the Oil

Terebinthinæ octarium dimidium;
of Turpentine half a pint;

Adjice Oleum Turebinthinæ liquefacto Cerato,
Add the Oil of Turpentine to the melted Cerate,

et misce.
and mix.

This liniment was first brought into use by Dr. Kentish, of Newcastle, as a dressing for burns. It is to be applied to parts recently burnt, and renewed until the eschars fall off, the strength of the patient being supported at the same time with wine, cordials, and opium, until healthy surfaces are produced.

CATAPLASMATA.

CATAPLASMS.

A variety of substances are employed for forming cataplasms, which are useful applications both in surgical and medical practice. The first notice of such preparations is in 2 Kings, chap. xx. ver. 7. "And Isaiah said, take a lump of figs. And they took and laid it on the boil, and he recovered."

CATAPLASMA FERMENTI.

CATAPLASM OF YEAST.

Recipe Farinæ libram; Fermenti Cerevisiæ
Take of Flour a pound; of the Yeast of Ale

octarium dimidium;
half a pint;

Misce, et adhibe calorem lenem, donec cœperint
Mix, and apply a gentle heat, until they begin

intumere.
to swell.

Prop.—Antiseptic. Yeast cataplasms are applied to gangrenous and ulcerated sores. Their advantages arise from the extrication of carbonic acid gas, during the fermentative process: they should, therefore, be frequently renewed.

CATAPLASMA SINAPIS.

CATAPLASM OF MUSTARD.

Recipe Seminum Sinapis, Seminum
Take of the Seeds of Mustard, (and) the Seeds

Lini usitatissimi, singulorum contritorum
of common Flax, of each powdered

libram dimidiam; Aceti calidi quantum sit
half a pound; of hot Vinegar as much as may be

satis;
sufficient;

Misce, ut crassitudo Cataplasmatis
Mix, that the consistence of a Cataplasm
fiat.
may be formed.

Prop.—Stimulant, rubefacient. Applied to the soles of the feet in the low stages of typhus fever, apoplexy, lethargic stupor, &c. mustard cataplasms will be found of essential service.

TABULA,

A TABLE,

Ostendens quâ ratione Opium, et
Showing in what proportion Opium, and
præparata quædam ex Antimonio, Arsenico, et
certain preparations of Antimony, Arsenic, and
Hydrargyro, continentur in quibusdam
Mercury, are contained in certain
Medicamentis compositis.
compound Medicines.

Confectio Opii continet granum Opii
Confection of Opium contains a grain of Opium
in circiter sex et triginta granis.
in about thirty-six grains.

Hydrargyrum cum Creta continet granum
Mercury with Chalk contains a grain
Hydrargyri in circiter granis tribus.
of Mercury in about three grains.

LINIMENTUM HYDRARGYRI continet drachmam
Liniment of Mercury contains a dram

Hydrargyri in circiter drachmis sex.
of Mercury in about six drams.

LIQUOR ARSENICALIS continet granum
Arsenical Solution contains a grain

Arsenici albi sublimati in fluidrachmis duabus.
of sublimed White Arsenic in two fluid-drams.

LIQUOR HYDRARGYRI OXYMURIATIS continet granum
Solution of Oxymuriate of Mercury contains a grain

Oxymuriatis Hydrargyri in fluidunciis duabus.
of the Oxymuriate of Mercury in two fluid-ounces.

PILULÆ HYDRARGYRI continent granum Hydrargyri
The Pills of Mercury contain a grain of Mercury

in granis tribus.
in three grains.

PILULÆ HYDRARGYRI SUBMURIATIS COMPOSITÆ con-
The compound Pills of Submuriate of Mercury con-

tinent granum Hydrargyri Submuriatis
tain a grain of the Submuriate of Mercury

in circiter granis quatuor.
in about four grains.

PILULÆ SAPONIS CUM OPIO continent granum
Pills of Soap with Opium contain a grain

Opii in granis quinque.
of Opium in five grains.

PULVIS CORNU USTI CUM OPIO continet
The Powder of burnt (Harts') horn with Opium contains

granum Opii in granis decem.
a grain of Opium in ten grains.

PULVIS CRETÆ	COMPOSITUS CUM OPIO	continet	
The compound	*Powder of Chalk with Opium*	*contains*	
granum	Opii	in scrupulis duobus.	
a grain	*of Opium*	*in two scruples.*	

PULVIS IPECACUANHÆ COMPOSITUS	continet	granum
Compound Powder of Ipecacuanha	*contains*	*a grain*
Opii	in granis decem.	
of Opium	*in ten grains.*	

PULVIS KINO COMPOSITUS	continet	granum	Opii
Compound Powder of Kino	*contains*	*a grain*	*of Opium*
in scrupulo.			
in a scruple.			

VINUM ANTIMONII TARTARIZATI	continet	granum
Wine of tartarized Antimony	*contains*	*a grain*
Antimonii tartarizati	in fluidrachmis quatuor.	
of tartarized Antimony	*in four fluid-drams.*	

UNGUENTUM	HYDRARGYRI FORTIUS	continet
The stronger	*Ointment of Mercury*	*contains*
drachmam	Hydrargyri	in drachmis duabus.
a dram	*of Mercury*	*in two drams.*

UNGUENTUM HYDRARGYRI MITIUS	continet	drachmam
The milder Ointment of Mercury	*contains*	*a dram*
Hydrargyri	in drachmis sex.	
of Mercury	*in six drams.*	

END OF THE PHARMACOPŒIA.

APPENDIX.

APPENDIX.

ON THE MANNER OF PRESCRIBING MEDICINES.

The *doses* of medicines throughout the preceding pages are such as are usually given to adults, and must, of course, always be varied according to the *age*, *constitution*, &c. of the patient. The following table will be found of use in apportioning the dose according to the different ages of individuals: —

Ages.	Proportional quantities.	Doses.
For an adult	Suppose the dose to be ONE	or 1 dram
under 1 year	Will require only .... $\frac{1}{12}$	5 grains
2 years	.... $\frac{1}{8}$	8
3	.... $\frac{1}{6}$	10
4	.... $\frac{1}{4}$	15
7	.... $\frac{1}{3}$	$\frac{1}{2}$ a scruple
14	.... $\frac{1}{2}$	$\frac{1}{2}$ a dram
20	.... $\frac{2}{3}$	2 scruples
above 21	The full dose	1 dram
65	The inverse gradation of the above.	

Women, in general, require less doses than men, and medicines of a very active nature should be administered to them with caution. Previously to prescribing for females, it is at all times necessary to inquire into the state of the uterine system, so as to avoid giving those medicines which are improper during the time of menstruation: an injudicious exhibition of aloetic or drastic purgatives might too copiously increase the periodical discharge from the uterus, which, on the other hand, might be seriously arrested by the use of acids and astringents.

It is also necessary to investigate the *temperament*, *habits*, and *idiosyncracy* of those for whom we prescribe. Persons of a sanguineous temperament are more easily affected by stimulants than the phlegmatic; and the latter frequently require such doses of active cathartics as would seriously inconvenience the former. Those accustomed to indulge in wine or spirits, or to resort to the use of narcotics, will require to be more actively treated, when stimulants and narcotics are medicinally requisite, than those who are strangers to such excitements in their ordinary way of life. Idiosyncracy is that peculiarity of disposition, which occasions some to be so affected by certain articles, whether of food or medicine, as to preclude the possibility of their taking them with impunity: thus, certain kinds of shell-fish produce an eruption over the whole body of some individuals, and others become so affected by opium, calomel, &c. in whatever dose or form they may be administered, that it becomes necessary to select that variety of remedy whose action shall be unaccompanied by any deleterious consequences.

The active ingredient of a prescription is termed the *basis;* that which assists the action, the *adjuvant;* that which corrects the action, the *corrigent;* and that in which the several substances are to be exhibited is called the *vehicle.*

In prescribing medicines, no two substances should be brought together that are incompatible or decompose each other, unless the resulting compound is to be the active ingredient. If care be not observed in this respect, two substances, which in themselves are inert, may give rise to a poisonous compound; yet how many there are who presume to prescribe without a knowledge of even the very rudiments of chemistry!

The following table will afford some assistance to those who are inexperienced in the union of pharmaceutical compounds:—

TABLE OF INCOMPATIBLES.

Substances,	*Incompatible with*
Acid, Citric	Alkalies. Earths. Soaps. Carbonates. Tartrate of potash, and most acetates.
—— Muriatic......	Alkalies. Carbonates. Tartrate of potash. Sulphuret of potash Most earths and oxides. Tartarized antimony. Tartarized iron. Nitrate of silver. Subacetate of lead.
—— Nitric	Alkalies. Earths. Oxides. Carbonates. Acetate of potash. Metals, except gold and platinum. Sulphate of iron. Acetate of lead. Sulphurets. Charcoal. Phosphorus. Sugar. Alcohol and spirits. Volatile Oils. Muriatic acid.
—— Sulphuric	Alkalies. Earths. Carbonates. Muriate of lime. Salts of baryta. Most metals, and their oxides. Acetate of lead.

Substances,	*Incompatible with*
Acid, Tartaric	Alkalies. Most earths. Carbonates. Salts of potash. Salts of lime. Salts of lead.
Alum................	Alkalies, and their carbonates. Tartrate of potash. Lime-water. Magnesia and its carbonate. Acetate of lead.
Ammonia, Solution of.................	All acids. Saline solutions of earths, except those of baryta or lime. Saline solutions of most metals. Solutions of opium.
——— Subcarbonate of..	Acids, except the hydrocyanic. Potash, soda, and their subcarbonates. Supersulphate of potash. Supertartrate of potash. Lime-water. Muriate of lime. Magnesia. Sulphate of Magnesia. Alum. Solutions of iron, except that of tartarized iron. Sulphate of zinc. Oxymuriate of mercury. Acetate and Subacetate of lead. Solutions of opium.
Ammonia, Solution of acetate of....	Most acids. Potash, soda, and their carbonates. Lime-water. Magnesia. Sulphate of magnesia. Oxymuriate of mercury. Sulphates of iron, copper, and zinc. Nitrate of silver. Acetates of lead, the solution containing some carbonic acid.

Substances,	*Incompatible with*
Antimony, tartarized	Alkalies and their carbonates. Acids. Some earths. Lime-water. Muriate of lime. Some metals, and their oxides. Acetate and subacetate of lead. Astringent vegetable infusions, decoctions, and tinctures. Spring and river water.
Arsenical solution	Acids. Acidulous salts. Lime-water. Muriate of lime. Sulphate of magnesia. Alum. Sulphate of iron. Muriate of iron. Nitrate of silver. Sulphate of copper. Sulphuretted hydrogen and compounds containing it. Decoction and infusion of cinchona.
Chalk	Acids and acidulous salts.
Copper, ammoniated	Acids. Potash. Soda. Lime-water.
Decoction, compound of Alöes..	Acids. Acidulous salts. Earthy salts. Metallic salts. All substances which are decomposed by, or which decompose subcarbonate of potash.
—— of Oak Bark	Alkaline solutions. Most metallic salts. Solutions containing gelatine. Decoction of *yellow-bark.*
—— Quince Seeds	Acids. Alcohol. Most metallic solutions.
—— Sarsaparilla....	Lime-water. Acetate of lead.

Substances,	*Incompatible with*
Infusion of Calumba	Lime-water. Acetate and sub-acetate of lead. Oxymuriate of mercury.
—— Cascarilla	Solutions of the salts of lead, silver, antimony, iron, and zinc. Lime-water.
—— Catechu	Salts of iron. Alkalies. Gelatine.
—— Chamomile	Salts of iron, mercury, silver, and lead.
—— Cloves	Solutions of the salts of lead, silver, antimony, iron, and zinc. Lime-water.
—— Cusparia	Solutions of the salts of most metals.
—— Digitalis	Probably the solutions of the salts of most metals.
—— Gentian, compound	Solution of acetate of lead, and sulphate of iron.
—— Horse radish.	Alkaline carbonates. Salts of silver and mercury.
—— Linseed, compound	Most metallic salts.
—— Rhubarb	The stronger acids. Metallic solutions. Some astringent infusions.
—— Roses, compound	Alkalies, earths, and all substances decomposed by sulphuric acid. Acetate of lead. Sulphate of iron. Sulphate of quina.
—— Senna, compound	Strong acids. Lime-water. Most metallic salts.

Substances,	*Incompatible with*
Infusion of Simarouba	Alkaline carbonates. Lime-water. Salts of lead, silver, mercury.
Iron, ammoniated, and Tincture of ammoniated	Alkalies, and their carbonates. Lime-water. Astringent vegetable bodies.
— Compound mixture of	All acids and acidulous salts, which act upon the protocarbonate of iron. Vegetable astringents.
— Tincture of muriate of.......	Alkalies, and their carbonates. Lime-water. Chalk. Magnesia and its carbonate. Astringent vegetable bodies. Solution of gum arabic.
— Subcarbonate of...	Acids and acidulous salts.
— Sulphate of	Alkalies, and their carbonates. Salts of baryta. Lime-water. Muriate of lime. Soaps. Nitrate of silver. Acetates of lead. Astringent vegetable bodies.
—— Muriate of..	Sulphuric acid. Sulphates. Potash. Soda. Carbonates of potash, soda, and ammonia.
Lead, Acetate and Subacetate of...	Sulphuric, muriatic, carbonic, citric, and tartaric acids. Alkalies. Common salt. Solution of acetate of ammonia. Lime-water. Chalk. Sulphuretted hydrogen, and compounds containing it. Vegetable astringent infusions. Strychnia. Most hard water.

Substances,	*Incompatible with*
Lime and Lime-water	Acids. Acidulous salts Alkaline carbonates. Salts of ammonia. Borates. Metallic salts. Astringent vegetable infusions.
Magnesia	Acids. Acidulous salts. Muriate of ammonia. Metallic salts.
——— Subcarbonate of..	Lime-water, and all the substances incompatible with magnesia.
——— Sulphate of........	Alkalies. Subcarbonates of potash and soda. Lime-water. Muriate of lime. Acetates of lead.
Mercury with Chalk...	Acids. Acidulous salts.
——— Red Oxide, and Nitric-Oxide of..	Acids. Acidulous salts. Sulphuretted hydrogen.
———Oxymuriate of......	Alkalies, and their carbonates. Potassæ sulphuretum. Sulphuretted hydrogen and compounds containing it. Soap. Lime-water. Tartarized antimony. Nitrate of silver. Acetates of lead. Infusions of bitter and astringent vegetables. Metallic iron, lead, copper, zinc, and bismuth.
——— Submuriate of	Alkalies, and their subcarbonates. Sulphuretted hydrogen and compounds containing it. Lime-water. Metallic iron, lead, and copper. Nitric acid.

Substances,	*Incompatible with*
Potash, Acetate of	Sulphuric, muriatic, and nitric acids, &c. Sulphates of soda and magnesia, and the other neutral salts.
——— Subcarbonate of (*Carbonate*)	Acids, except the hydrocyanic. Acidulous salts. Muriate and acetate of ammonia. Lime-water. Muriate of lime. Sulphate of magnesia. Sulphate of iron. Alum. Tartarized antimony. Nitrate of silver. Ammoniated copper. Ammoniated iron, and tincture of the same. Tincture of muriate of iron. Sulphate of zinc. Calomel. Corrosive sublimate. Acetate and subacetate of lead.
——— Carbonate of (*Bicarbonate*)	The same as subcarbonate of potash, except sulphate of magnesia, and calomel.
——— Solution of	Acids. Acidulous salts. Subcarbonate of ammonia. Acetate of ammonia. Muriate of ammonia. Preparations of earths, and the ordinary metals held in solution by acids. Calomel. Corrosive sublimate.
——— Sulphate of	Tartaric acid. Muriate of baryta. Muriate of lime. Acetate and subacetate of lead.
——— Supersulphate of..	Alkalies, earths, and their carbonates. Most oxides. Metals.

Substances,	*Incompatible with*
Potash, Sulphuret of (*Potassæ Sulphuretum*)	Acids, which combine with the potash, and expel sulphuretted hydrogen gas. Most metallic solutions.
—— Tartrate of	Most acids and acidulous salts. Lime-water. Muriate of lime. Salts of lead and silver.
Quina, Sulphate of	Muriate of baryta. Muriate of lime. Tincture of galls. Acetate and subacetate of lead. Compound infusion of roses, and astringent vegetable infusions, or decoctions.
Silver, Nitrate of..	Almost all spring and river water. Potash, soda, and their carbonates. Soaps. Lime-water. Sulphuric, muriatic, and tartaric acids, and the salts of these acids. Carbonate of ammonia. Arsenical solution. Sulphuretted hydrogen and compounds containing it. Astringent vegetable infusions, or decoctions.
Soda Subcarbonate (*Carbonate*)	Acids. Acidulous salts. Muriate of ammonia. Earthy and metallic salts. Lime-water.
—-Carbonate (*Sesquicarbonate*)..	The same as *Soda subcarbonate.*
—-Sulphate of....	Subcarbonate of potash. Salts of baryta. Muriate of lime. Nitrate of silver. Acetate and subacetate of lead.

Substances,	*Incompatible with*
Soda, tartarized....	Most acids and acidulous salts, except supertartrate of potash.
Tincture of Opium	The alkalies and their subcarbonates. Most metallic salts. Infusion of galls, &c.
Water	It is customary with most practitioners to use common water in dissolving medicines on all occasions; but as carbonic acid, carbonate and sulphate of lime, and muriate of soda are generally contained in it, it is evident that distilled water ought frequently to be employed whenever minute portions of some substances, acted upon by these salts, are to be held in solution. Substances kept in solution to be used as *tests* ought never to be dissolved in common water. Rain water may be substituted for distilled water when the latter is not at hand, with the precautions mentioned at page 211.
Zinc, Sulphate of	Alkalies, and their carbonates. Lime-water. Hydrosulphurets. Astringent vegetable infusions.
—— Oxide of	Acids. Alkalies. Acidulous salts.

ON THE TESTS OF CERTAIN SUBSTANCES.

The following list comprises those substances, which every medical man ought to be able to recognise by their appropriate tests. Substances employed as tests should be in the greatest state of purity, and distilled water must always be employed as the solvent, otherwise fallacious appearances and false conclusions will be the result of their application. Distilled water should also be used for dissolving the materials that are to be subjected to examination. No one should venture to give an opinion in a court of justice respecting the individuality of a poison, when death is supposed to be the consequence of its administration, unless he be well experienced in the art of applying tests; for the evidence of an inexperienced operator might either be the cause of the innocent suffering unjustly, or the guilty escaping punishment. He, therefore, who is in the least doubtful of his own capability of analyzing the contents of the stomach, or any article of food supposed to contain poison, so as to prove whether it exist or not, will do well to consult the judgment of some one skilled in analysis, whenever a case of death, believed to originate in poisoning, shall come under his observation.

As there is not room in this place to insert every particular respecting the *art* of applying tests, the reader is referred to the treatise mentioned below,* to

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* Chemical Re-agents or Tests, and their Application in analyzing Waters, Earths, Soils, Metalliferous Ores, Metallic Alloys, &c. brought down to the present state of Chemical Science, by William Maugham. Published by Tilt, Fleet-street.

Dr. Christison's Treatise on Poisons, and *Orfila on Poisons.*

*** Several substances are enumerated in the following list, which are not of a poisonous nature :

ACID* ACETIC.—This acid is set free from its base by sulphuric acid. It is readily distinguished from all the other acids by its taste, and volatility and smell when heated. A salt is known to be an acetate in a solid state if, when moistened with a little sulphuric acid, and the mixture warmed, the vapours given off have a strong smell of vinegar.

ACID BENZOIC.—Benzoic acid is known by its volatility and smell. All its salts are decomposed by muriatic acid, benzoic acid being deposited in crystals when the solution has been sufficiently concentrated by evaporation.

ACID BORACIC.—If a solution of this acid in alcohol be set on fire, it burns with a characteristic green flame by which its presence is indicated. To distinguish a borate from other salts, digest it in sulphuric acid slightly in excess, evaporate to dryness, and digest the residue in alcohol, which dissolves the boracic acid set free by the sulphuric acid, and its presence is then shewn as above. It was first observed by Faraday that this acid turns turmeric paper brown after the manner of alkalies. It has only a slight action on litmus paper.

ACID CARBONIC.—Carbonic acid uncombined with a base, or combined in excess, is detected by lime-water, carbonate of lime being precipitated, and redissolved on the addition of a solution of carbonic acid, or nitric or muriatic acid. Carbonic acid produces an

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* The action of acids on litmus paper is explained at page 78.

evanescent, feeble redness with litmus paper. The carbonates may be easily distinguished from other salts by their effervescing without smell on the addition of almost all acids.

ACID CITRIC.—Citric acid is known by its taste, and the form of its crystals, which are rhomboidal prisms terminated by four plain surfaces. It forms an insoluble citrate with lime, and a soluble one with potash, which is also deliquescent. All the citrates are decomposed by sulphuric acid, and they are all soluble in an excess of citric acid.

ACID GALLIC.—This acid affords a brownish-green precipitate with lime-water, which is redissolved by adding the acid solution in excess. It produces a precipitate more or less dark with the salts of iron, the colour depending on the state of oxidation of the iron in the salt, but by exposure to the air, the iron, if in the state of protoxide, absorbs oxygen, and the precipitate eventually becomes bluish-black. This, however, does not distinguish it from *tannin*, but it is known from that substance by producing no precipitate when added to a solution of gelatine. The salts of this acid have not been much examined.

ACID HYDRIODIC.—A solution of hydriodic acid, or of any of the hydriodates, is decomposed by adding either sulphuric or nitric acid or chlorine; the acids either affording oxygen to the hydrogen of the hydriodic acid, or the chlorine combining directly with it, and setting the iodine free, which is recognized by a blue colour, and eventually a blue precipitate being afforded by the addition of a cold solution of starch. The best way of applying the test is to mix the solution first with starch, and then to add a drop or two of strong sulphuric acid, which will produce the characteristic blue colour if iodine be present.

ACID HYDROCYANIC.—This acid is known in a free state by its odour, which is similar to that of the blossoms of the peach-tree. It has only a feeble and transient action on litmus paper.

If a fluid containing hydrocyanic acid be agitated with the red oxide of mercury in fine powder, the oxygen of the mercury combines with the hydrogen of the acid, and the mercury combines with the cyanogen forming *cyanuret of mercury*, which is obtained in crystals by slowly evaporating the solution, and may be known by affording cyanogen gas when heated in a proper tube by the flame of a spirit lamp. Cyanogen gas burns with a beautiful violet-coloured flame.

The following method of detecting this acid was first proposed by Scheele :—add a solution of a *protosalt of iron*, protosulphate of iron *(green vitriol)*, for instance, to a solution either containing or supposed to contain hydrocyanic acid, and then add solution of pure potash slightly in excess, which will precipitate the protoxide of iron. Let the whole be exposed to the air for five or six minutes, and then add a sufficient quantity of muriatic or sulphuric acid to redissolve the precipitate, and the blue compound called *prussian blue*, which is a ferrocyanate of the peroxide of iron, will become apparent, if hydrocyanic acid was at first present. During the above process, the protoxide of iron of the protosulphate reacts upon some of the hydrocyanic acid, giving rise to the formation of water and cyanuret of iron, the latter of which uniting with the undecomposed hydrocyanic acid forms ferrocyanic acid, and this combining with the oxide of iron, which is brought to the state of peroxide by absorbing oxygen, constitutes the blue compound in question. The persalts of iron, when quite free from the protoxide, cannot be used in the place of a protosalt, protoxide of iron being absolutely necessary to the success of the experiment, as shewn by Scheele, Proust, and Turner.

Nitrate of silver is recommended by Orfila as a delicate test of hydrocyanic acid. It produces a white precipitate even in a very dilute solution of the acid, which is distinguished from the other white precipitates of silver by being insoluble in nitric acid at ordinary temperatures, but readily soluble in that acid at its boiling temperature. The precipitate, dried and heated, gives off cyanogen gas, which is recognized by burning with a violet-coloured flame when set on fire

Sulphate of copper produces with hydrocyanic acid, when rendered alkaline with a little solution of potash, a greenish precipitate, which is rendered nearly white by adding a little muriatic acid, which it is necessary to introduce for the purpose of redissolving a portion of oxide of copper thrown down by the potash. The precipitate is then *cyanuret of copper*. Dr. Christison observes that as the precipitate thus afforded is colourless, the test is an insignificant one when compared with that of a protosalt of iron.

To detect hydrocyanic acid, when it has been taken into the stomach and produced death, MM. Leuret and Lassaigne propose the following manner of proceeding, by which it may be discovered as many as two or three days after it has proved fatal:—the stomach is to be cut into small pieces and placed, with its contents, in a retort with water; the whole is to be acidulated with sulphuric acid, and distillation is to be carried on at a temperature of 212° F. The volatile products being collected in a receiver surrounded with ice, may afterwards be tested as above for hydrocyanic acid.

ACID, LITHIC.—See *Acid uric*.

ACID, MECONIC.—This acid yields a red colour with a persalt of iron, and an emerald-green with the sulphate of copper. By this means the presence of opium may be known.

ACID, MURIATIC.—Muriatic acid in a concentrated state is known by the odour of its fumes, which are white, and become more dense when brought against the mouth of a bottle containing solution of ammonia, muriate of ammonia being formed. Muriatic acid is known in a free state, or in combination with a base, by adding to a solution containing it, a solution of nitrate of silver, a white precipitate, *chloride of silver*, being produced. The chlorine of the muriatic acid unites with the silver of the nitrate forming chloride of silver, and the hydrogen of the muriatic acid unites with the oxygen of the oxide of silver and forms water, the nitric acid of the nitrate either being set free in solution or combining with a base, according as the muriatic acid may be in a pure state or in combination with a base. Chloride of silver is known by being at first of a white colour, and soon becoming dark by exposure to light; it is insoluble in water and nitric acid, but is dissolved by solution of pure ammonia. It is not decomposed at a red heat, but on cooling forms a translucent mass which cuts like horn, and has hence been called *luna cornea* or *horn silver*.

In testing for this acid where it is supposed to have been the cause of death in its pure state, it must be remembered that the stomach may contain common salt, which produces the same action on the nitrate of silver as muriatic acid itself. We must, therefore, draw our conclusions from the *quantity* of precipitate produced. It is recommended to place the contents of the stomach, and the stomach itself, cut in small pieces, in a retort with distilled water, and then to distil into a tubulated receiver dipping into a solution of nitrate of silver, by which means the characteristic precipitate will be afforded. If the acid should have been neutralized by giving magnesia or soap as antidotes, the muriate of magnesia or muriate of soda formed may be tested as muriatic acid itself.

Muriatic acid is known from chlorine by not possessing the smell and bleaching properties of the latter.

ACID, NITRIC.—This acid is easily known in a concentrated state by the odour and appearance of its fumes. Nitrous acid vapour is eventually produced when nitric acid is acted upon by copper, mercury, and some other metals. See *nitric oxide* in the Introduction. With potash, nitric acid forms a salt, nitrate of potash, which crystallizes in prisms. If a liquid contain nitric acid in a free state or in combination with a base, it will not dissolve gold-leaf, but it is capable of doing this on the addition of muriatic acid, *nitro-muriatic acid* being formed. The nitrates deflagrate when projected on red-hot charcoal, and when moistened with strong sulphuric acid, white acid vapours are liberated, having the odour of nitric acid, and when condensed the liquid acts on the metals as above. No re-agent will throw down a precipitate on being added to a nitrate in solution, because all the nitrates are soluble in water.

ACID OXALIC —This acid has been frequently mistaken for Epsom salts, which it somewhat resembles in appearance; but it is readily distinguished from them by its extreme sourness when tasted, even in the smallest quantity. It is known from all other acids by the form of its crystals, which are slender, flattened, four and six-sided prisms, terminated by two-sided summits; their primary form is an oblique rhombic prism. This acid is precipitated from its solution by lime-water, the oxalate of lime thrown down is insoluble in excess of oxalic acid, and is more insoluble in water than any of the other compounds of lime.

Dr. Christison recommends the following process for detecting oxalic acid, after all the alterations it may have undergone in the stomach :—" The first object is to procure a solution.—If an antidote has not been given, the contents and tissues or vomited matters are to be boiled, distilled water being added if required. The acid is then to be neutralized with potash, and the whole filtered. If magnesia or chalk has been given as an antidote, the insoluble matter is to be separated by filtration, and boiled for twenty minutes in a solution of carbonate of potash, in 18 or 20 parts of water. A double interchange of elements takes place between a part of the carbonate of potash and a part of the oxalate of lime or magnesia; and in consequence some carbonate of lime or magnesia is thrown down, while some oxalate of potash will be formed in solution. The fluid after filtration is to be neutralized with pure nitric acid. Oxalic acid being now in solution, whatever may have been its original state, the next step is to separate it from the animal and vegetable matter dissolved along with it. I have tried various plans for this purpose, but have found none to answer so well as precipitation with muriate of lime, so as to procure an oxalate of lime; which, after being well washed, is to be decomposed by boiling it in a solution of carbonate of potash as before. An oxalate of potash will again be found in solution. The excess of alkali is finally to be neutralized with nitric acid."

The following tests are also recommended, which may either be applied to the acid in a free state, or in combination with an alkali which renders their action more delicate:—

Sulphate of copper gives a bluish-white precipitate of oxalate of copper, insoluble in a few drops of muriatic acid, but soluble in a larger quantity.

Nitrate of silver throws down a white precipitate, oxalate of silver, which being collected on a filter, dried, and heated, becomes brown on the edge, then fulminates and is dispersed.

Acid phosphoric.—This acid, when perfectly neutralized with soda or potash, is known by a white precipitate, *phosphate of lead*, being produced by acetate of lead, which is soluble in nitric acid; and a yellow one, *phosphate of silver*, by solution of nitrate of silver, which is soluble in nitric acid and ammonia. The solution of the neutral phosphate is not affected by passing a stream of sulphuretted hydrogen gas through it. The insoluble phosphates may be converted into soluble ones by boiling them in a strong solution of carbonate of potash or soda, phosphate of potash or soda being formed by double decomposition.

ACID PRUSSIC.—See *Acid hydrocyanic*.

ACID SULPHURIC.—This acid is readily detected in a free state, and in all its combinations, by a solution of muriate or nitrate of baryta, throwing down a white precipitate, *sulphate of baryta*, which is known by its insolubility in both acids and alkalies. No acid but the sulphuric forms a salt with baryta insoluble in nitric acid. To tell whether an insoluble substance be a sulphate, powder it, and mix it with about three times its weight of carbonate of potash, or carbonate of soda, and expose the whole for half an hour to a red heat in a platinum crucible; double decomposition takes place, sulphate of potash or soda being formed in solution. Digest the residue in water, filter the whole solution, and add a little muriatic or nitric acid to neutralize any free alkali that may be present, and then test for the presence of sulphuric acid as before. The latter way of proceeding may be resorted to when sulphuric acid has been taken as a poison, and neutralized in the stomach with its proper antidote, chalk.

It must be borne in mind that the secretions of the stomach contain sulphates, so that we must form our judgment in cases of poisoning by sulphuric acid from the quantity of precipitate obtained. When this acid has been spilt on any of the articles of dress, in such cases, the parts should be boiled in distilled water, the fluid filtered, and the above tests resorted to.

ACID, TARTARIC.—This acid is known by affording a white precipitate, *bitartrate of potash*, with any of the salts of potash in solution. With lime-water it produces a white precipitate, *tartrate of lime*, which is readily soluble in excess of the acid.

ACID, URIC.—When this acid is mixed on a watch-glass with a few drops of nitric acid, and the mixture is evaporated to dryness by means of a spirit lamp, a beautiful purple colour is produced, the tint of which is improved by the addition of water. The compound in question is *purpurate of ammonia*, which is generated by the action of the two acids on each other.

ALBUMEN.—This compound is readily known from all other animal fluids by becoming coagulated with hot water, as explained at page 348. Albumen is precipitated by solution of corrosive sublimate; the precipitate consists of calomel and albumen. This test acts so delicately as to produce a milkiness, when the albumen is diluted with 2,000 parts of water. Muriate of tin, muriate of gold, subacetate of lead, and solution of tannin also precipitate albumen. Ferrocyanate of potash is a delicate test for albumen, but previously to applying it, a little acetic acid must be added to neutralize any free soda that may be present. Galvanism is considered the most delicate test of the presence of albumen. When a liquid containing it is exposed to the agency of galvanism, it coagulates on the wire connected with the positive pole of the battery, and pure soda is found at the negative wire. Vegetable albumen is coagulable by heat like animal albumen, and also resembles it in several other respects.

ALUMINA.—This earth is thrown down from its combinations with acids, by the alkaline carbonates, and pure ammonia, in the state of hydrate. It is also precipitated by pure potash or soda, but excess of either alkali redissolves it.

AMMONIA.—This alkali is always known in a free state by its peculiar odour, and by its evanescent action on turmeric paper. A glass-rod moistened with muriatic acid and placed in an atmosphere of ammoniacal gas becomes immediately surrounded by dense white clouds of muriate of ammonia. All the salts of ammonia afford ammoniacal gas, when heated with pure lime or any other alkaline earth or pure alkali.

Antimony.—This metal is detected in solution by sulphuretted hydrogen, which affords an orange-coloured precipitate, *hydrated protosulphuret of antimony,* which is dissolved in hot muriatic acid with disengagement of sulphuretted hydrogen gas; by adding water to the solution, white submuriate of antimony is thrown down. The hydrated protosulphuret is also soluble in solution of pure potash. For the reduction of antimony to a metallic state in cases of poisoning, see " *The detection of Antimony in mixed Fluids, by Dr. Turner, Edinburgh, Med. and Surg. Journal, vol.* xxviii., *page* 71; or *Dr. Christison's Treatise on Poisons.*"

Arsenic.—This metal in a pure state possesses no deleterious properties, but when combined with oxygen, as in the arsenious acid, or *white arsenic* of commerce, it is one of the most virulent of poisons. It also enters into several other combinations, which are poisonous. The tests for arsenious acid are extremely numerous; but as many of these are objectionable, and we have not room to enter into every particular respecting them, we shall only notice the following principal ones, and those who are desirous of further information may refer to *Henry's Elements of Chemistry; Dr. Christison's Treatise on Poisons; Orfila on Poisons;* and *Beck's Elements of Medical Jurisprudence.*

Lime-water added in excess to solutions containing white arsenic forms a white precipitate, *arsenite of lime,* which being scarcely more soluble than sulphate of lime, sinks to the bottom, in form of very minute crystals. Arsenite of lime is soluble in excess of the arsenious solution, and it may be further observed, that it is dissolved by all acids which will dissolve lime. Lime-water has lost the reputation it formerly had as a test for shewing the presence of arsenious acid; for, in mixed fluids, such as broth, milk and water, &c. on account of its lightness, it is readily kept in a state of suspension.

Nitrate of silver, in conjunction with potash, soda, or ammonia, forms an excellent test for detecting the minutest portion of arsenic: its application was first pointed out by Mr. Hume. The power of this arsenical test is astonishingly great; by means of it we are enabled to detect one part of arsenic in 400,000 parts of water. Nitrate of silver, however, does not detect arsenic unless some alkali be present. Mr. Hume advises to saturate the arsenic first with any alkali, and then to apply a stick of nitrate of silver *(lunar caustic)* to the surface of the solution: if a bright yellow precipitate be formed from the point of contact, we may expect the presence of arsenic.

Dr. Marcet has pointed out the following modification of this test:—"let the fluid suspected to contain arsenic be filtered, and suffer one end of a glass rod, wetted with solution of ammonia, to be brought into contact with it, and let the other end of the rod, also wetted with the solution of nitrate of silver, be immersed in the mixture: a yellow precipitate will appear at the point of contact, and will gradually fall to the bottom. As this precipitate is soluble in ammonia, the greatest care is necessary not to add an excess of that alkali."

The objection arising from the action of muriatic acid on this test, when thus employed for arsenic, is easily obviated; for if a little muriatic acid be added to the fluid suspected to contain arsenic previously to adding the alkali, and the nitrate of silver be very cautiously added till the precipitate ceases, the muriatic acid will be removed, the arsenic remaining in solution, which is shewn by adding a little of any alkali, when the characteristic precipitate will appear.

Notwithstanding what is above stated, there is much objection to this test as regards arsenious acid in mixture with muriates. Besides, the test is not satisfactorily applicable to arsenious acid in mixed fluids containing animal or vegetable substances.

Mr. Hume has paid particular attention to the nature of this test, and we are indebted to him for some further particulars concerning its application. He recommends to "dissolve a few grains, say ten, of nitrate of silver in about nine or ten times its weight of distilled water; to this add, by a drop at a time, solution of ammonia, till a precipitate be formed. Continue to add the ammonia cautiously, now and then shaking the bottle, till the precipitate be taken up, and the solution again become transparent, or *nearly* so.*

"Here we have one neat and simple liquid, which, if kept in a phial with a glass stopper, will not easily spoil, and, therefore, may be always at hand; its application is also equally simple, for nothing more is required than to dip a slip of glass into this liquor, and apply it to the surface of the solution containing arsenic. Should the material suspected to contain the poison be a solid substance, such as a mixture of sugar, meal, bread, meat, or any other kind of food, let some boiling water be poured upon it, and filter the solution through paper; then, having allowed this to become cold, apply the test liquor with a piece of glass in the way before mentioned."

Mr. Hume further observes, "that in proportion to the degree of dilution of the fluid containing arsenic, more or less time should be allowed for the effect to become perceptible. It has been stated, that phos-

* This test of Mr. Hume's is called the *ammoniacal-nitrate of silver* test.

phate of soda produces an effect with this test similar to the change produced by arsenic; and that false conclusions might be drawn, were similar steps pursued with two solutions of phosphate of soda and arsenite of potash. But take an opposite position in this way: —Let two glass vessels be charged, one with phosphate of soda, the other with a simple solution of oxide of arsenic (arsenious acid, *white arsenic*). Now apply the dry nitrate of silver, as before, to the phosphate, and a yellow precipitate will appear; but no such effect will happen to the solution of arsenic. A separate piece of nitrate of silver should be taken in these experiments, to avoid error; for the morsel that has been dipped into the phosphate should not be suffered to touch the arsenical solution. Any slight opacity in the *simple solution* of arsenic, on the contact with the nitrate, is not to be regarded as arising from any union with arsenic. Being now convinced that there is no *yellow* precipitate yet generated, let the operator hold a piece of blotting paper, very slightly moistened with a solution of ammonia, just over the surface of the arsenical fluid, at the same time moving the vessel so as to cause an undulation, and there will instantly form a copious yellow indication of the presence of arsenic."

Ammoniacal sulphate of copper.—This test may be made by adding solution of bisulphate of copper (*blue vitriol*) to solution of ammonia, until it is no longer dissolved.

This test throws down a precipitate from a solution of arsenious acid of an apple-green or grass-green colour, which is arsenite of copper, a compound sold in the shops under the name of *Scheele's green.* The precipitate is not soluble in water nor in a solution of arsenious acid, unless added largely in excess; but it is soluble in liquid ammonia, and in nitric and most other acids. This test is now considered as very objectionable, as it has been found by Dr. Christison to produce a greenish precipitate with certain animal and vegetable infusions which do not contain arsenic; and which, as merely relates to colour, might be mistaken for the precipitate occasioned by the same test applied to a solution which does contain arsenic. On the other hand, when arsenious acid has been added in a *small* quantity, to tea, porter, and other mixed fluids, this test occasions no precipitate, the arsenite of copper being soluble in tannin, and in some other vegetable and animal principles.

Sulphuretted hydrogen either passed through a solution of arsenious acid in the state of gas, or added in solution in distilled water, produces a yellow precipitate, *sulphuret of arsenic* (*orpiment*). To facilitate the deposition of the precipitate, boil the liquid so as to expel any excess of sulphuretted hydrogen. To whatever suspected fluid this test is applied, care must be taken that it contain no free alkali, otherwise the sulphuret will be dissolved. This may be guarded against by neutralizing the alkali with acetic acid.

Black flux.—When a white powder is found in the contents of the stomach, or in any articles of food, and suspected to be arsenic, besides treating it with the preceding tests in a state of solution, it may be reduced to the metallic state by the black flux. This flux is made by deflagrating two parts of bitartrate of potash (*cream of tartar*), with one part of nitrate of potash, by which means the acids in the two salts become decomposed, and by an interchange of affinities there are produced carbonic oxide, carbonic acid, and nitrogen, which escape in the state of gas, while some carbonic acid remains with the potash forming carbonate of potash, and this being mixed with charcoal, derived from the tartaric acid, constitutes the flux in question.

To detect the presence of arsenic by means of the *black flux*, put a little of the white powder, suspected to be white arsenic, into a test tube with a little of the flux; stop the mouth of the tube with a bit of paper put in rather loosely; hold that part of the tube containing the materials in the flame of a spirit-lamp, and the arsenic will sublime, and collect in the metallic state in the cool part of the tube, and will be recognized by its steel-coloured lustre. In the above process, the charcoal of the flux abstracts oxygen from the arsenious acid; and the carbonate of potash serves to retain the arsenious acid until the temperature is sufficient for this to take place. Metallic arsenic placed on hot iron will afford the smell of garlic. It is stated by some authors, that white arsenic will give the same smell when put on hot iron; but if this should be the case, it must be in consequence of the reduction of the metal, because the garlic smell only arises from arsenic in a metallic state. When the black flux is not at hand, two parts of very dry carbonate of potash (the salt of tartar of the shops) and one of powdered charcoal may be employed.

With respect to this flux it is observed by Dr. Christison, "that the proper material for reducing the oxide of arsenic is freshly ignited charcoal. With this substance the whole metal of the oxide of arsenic is disengaged. The black flux, which is usually recommended, is ineligible, if the quantity of oxide is very small; for only a part of the metal is disengaged, the remainder continuing in the flux, probably in the form of arseniuret of potassium."

A further confirmation of the reality of arsenic is, as Dr. Turner observes, "by reconverting the metal into arsenious acid, so as to obtain it in the form of resplendent octohedral crystals. This is done by holding that part of the tube to which the metallic arsenic adheres, about three-fourths of an inch above a very small spirit-lamp flame, so that the metal may be slowly sublimed. As it rises in vapour, it combines with oxygen from the atmosphere, and is deposited in crystals within the tube. The character of these crystals, with respect to volatility, lustre, transparency, and form, is so exceedingly well marked that a practised eye may safely identify them, though their weight should not exceed the $\frac{1}{100}$th part of a grain. This experiment does not succeed unless the tube be quite dry." The same author observes, "that of the various tests for arsenic, the only one which gives uniform results, and is applicable to every case, is *sulphuretted hydrogen*:—all the rest may be dispensed with." When the precipitate thrown down with sulphuretted hydrogen is submitted to the action of the black flux, the latter then acts as follows: the potassium of the potash holds back the sulphur of the sulphuret, and the metallic arsenic sublimes, the charcoal being only of use to assist the decomposition of the carbonate of potash.

There is some discrepancy of opinion respecting the solubility of white arsenic in water. According to Klaproth and Bucholz, 1000 parts of boiling water dissolve 77.75 parts; but when the solution has cooled to 60° F. it is then found only to retain 30 parts. 1000 parts of water at 60° F. only dissolve 2.5 parts. Guibourt has lately observed that opaque and transparent white arsenic differ in solubility: 1000 parts of temperate water in 36 hours dissolve 9.6 of the transparent variety, and 12.5 of the opaque; and 1000 parts of boiling water take up 97 parts of the transparent, retaining 18 when cold, and 115 of the opaque, retaining 29 when cold.

Baryta.—All the compounds of this earth are poisonous except the sulphate, see page 123. All the soluble salts of this earth are decomposed by alkaline carbonates, carbonate of baryta being thrown down. Sulphuric acid, or any soluble sulphate, also decomposes them, a precipitate, *sulphate of baryta*, being thrown down, which is perfectly insoluble in water, and in acid, and alkaline solutions. Baryta is soluble in water, and the solution has an alkaline reaction. The salt which it forms with muriatic acid crystallizes very readily by due evaporation in the form of four, six, or eight-sided tables: these crystals are permanent when exposed to the air, and are insoluble in alcohol.

Bismuth.—This metal is thrown down from its solutions by ferrocyanate of potash: the precipitate is white, and insoluble in muriatic acid. Tincture of galls gives an orange precipitate. Sulphuretted hydrogen or hydrosulphuret of ammonia gives a black precipitate, or when the oxide is only in small quantities a very dark brown precipitate, which is insoluble in an excess of the precipitant. The salts of bismuth are distinguished from those of lead by giving no precipitate with dilute sulphuric acid. Bismuth is precipitated from its solution in nitric acid in the form of a subnitrate (see *Bismuthi subnitras*, page 134), which distinguishes it from other metals. Metallic zinc precipitates bismuth from its solutions in the metallic state in the form of a black spongy mass.

Chlorine.—This is known in a free state by its odour. It affords a precipitate with nitrate of silver like muriatic acid, but is distinguished from that acid by its smell and bleaching properties. Chlorides, in the solid state, when mixed with concentrated sulphuric acid and warmed, effervesce, and give off muriatic acid gas: the chlorides of mercury, protochloride of tin, and chloride of silver are however exceptions. When mixed with peroxide of manganese, or the deutoxide or peroxide of lead, and concentrated sulphuric acid, they give off chlorine gas.

Copper.—This metal is recognized in any clear solution, by the addition of a little solution of pure ammonia affording a beautiful blue colour. Copper is detected in mixed fluids by sulphuretted hydrogen. If this throw down a precipitate, collect it and heat it to redness, so as to destroy any animal or vegetable matter it may contain, then act upon it with nitric acid, by a gentle heat, so as to convert it from the state of sulphuret to that of sulphate. When this is now acted upon by ammonia, the characteristic blue colour of ammoniuret of copper will become visible. By this mode of proceeding Dr. Christison has detected "a tenth of a grain of sulphate of copper, or, more properly speaking, a 35th of a grain of oxide of copper in five ounces, that is in 84,000 times its weight, of tea made with cream and sugar." It is to be observed that previously to the application of sulphuretted hydrogen to any animal or vegetable fluid supposed to contain copper, the fluid is to be first boiled and then treated with dilute acetic acid, which takes up the copper from the organic principles with which it may have combined, forming insoluble compounds. Copper is precipitated from its solutions in a metallic state by a piece of bright iron.

Gelatine.—See page 350.

Iodine.—If a solution of starch be added to a liquid containing even a very minute quantity of iodine in an uncombined state, it produces with it an indigo-blue colour, and a precipitate, *ioduret of starch*, of the same hue, is slowly thrown down. The delicacy of this test is astonishingly great. It will indicate, according to Stromeyer, $\frac{1}{450000}$th part of iodine in a liquid. Hence iodine and starch are tests for each other. The blue colour produced by the contact of iodine and dissolved starch, varies according as either the one or the other of the substances predominates. When the two bodies are in due proportion, the colour is a pure intense indigo-blue; but it is black when iodine prevails, and of a reddish-blue or violet colour when starch is in excess. Ioduret of starch is soluble in dilute sulphuric acid, and the liquor is of a fine blue colour; and with concentrated sulphuric acid a brown compound is obtained, which becomes also blue when diluted with water.

Starch becomes soluble in water at the temperature of about 170 F. and it ought always to be added quite cold when employed as a test for iodine. For the manner of detecting iodine in the hydriodates, see *Hydriodic Acid.*

Iron.—Salts containing iron in the state of protoxide are decomposed by pure alkalies, a white hydrate of the protoxide being precipitated; by alkaline carbonates, a white carbonate being precipitated; by ferrocyanate of potash, a white ferrocyanate of protoxide of iron being precipitated: the first two precipitates become green and eventually red by exposure to the air, and the last green and then blue by the same exposure, the metal being converted into the state of peroxide by the absorption of oxygen. Solution of galls affords no change of colour.

Salts containing the peroxide of iron are decomposed by pure alkalies, a red hydrate being precipitated. The carbonated alkalies behave in a similar manner, carbonic acid not combining with peroxide of iron in a solid state; but the colour of the precipitate is somewhat lighter than when the pure alkalies are employed. Ferrocyanate of potash, a very delicate test, throws down a precipitate, the ferrocyanate of the peroxide of iron (*Prussian blue*). Infusion of gall nuts gives a black precipitate.

The salts of iron containing the protoxide are mostly green and crystallizable; those containing the peroxide are mostly red and uncrystallizable.

Lead.—All the salts of lead contain the protoxide of the metal, and those salts which are soluble in water may be known by sulphuric acid or any soluble sulphate throwing down a white precipitate, *sulphate of lead,* which is soluble in solution of pure potash, but insoluble or only sparingly soluble in dilute acids. It is only with the protoxide of lead, lime, baryta, and strontia, that sulphuric acid forms sulphates insoluble in dilute acids. The sulphate of lead is easily known from the sulphates of lime, baryta, and strontia, by its solubility in solution of pure potash, and by becoming black when moistened with hydrosulphuret of ammonia or solution of sulphuretted hydrogen; and when treated with soda on charcoal before the blow-pipe, it affords metallic lead like all the other salts of lead. A rod of metallic zinc precipitates lead in a metallic state from its solutions. There are a number of other tests for lead, but the above are quite satisfactory.

For detecting lead in mixed fluids, see the works already alluded to.

LIME.—Oxalic acid, especially in combination with ammonia or potash (*oxalate of ammonia*, or *binoxalate of potash*) is a most delicate test of lime and its salts in solution, throwing it down in the state of an insoluble oxalate. By this test one grain of lime may be detected in 24,250 grains of water. This test, however, does not serve to distinguish lime from baryta or strontia in solution, the oxalates of these earths being also sparingly soluble in water, and, like oxalate of lime, soluble in that fluid when acidulated with muriatic or nitric acid. Lime is not precipitated by sulphuric acid in a very dilute state, on account of the solubility of sulphate of lime; but baryta and strontia are readily thrown down by it.

MAGNESIA.—This earth is precipitated from its solutions by the pure alkalies as a bulky hydrate, which is soluble in dilute sulphuric acid: the latter circumstance distinguishes magnesia from the other alkaline earths, their sulphates being insoluble, or only very sparingly soluble.

MERCURY.—Protoxide of mercury is black, and is decomposed at a strong heat, oxygen gas and metallic mercury being afforded.—"If the protosalts of mercury are mingled with dry soda, placed in a glass tube closed at one end, and heated to redness by the flame of the *blow-pipe*, they are reduced, and mercury sublimes in the form of a grey powder, which, on being rubbed together by a glass rod, can easily be seen to form globules of metallic mercury."—(*Berzelius.*)

"Muriatic acid and solutions of the *chlorides* produce in solutions of protoxide of mercury, even when added in the smallest quantities, a white precipitate, which is insoluble in simple acids, and is rendered black by ammonia.

"The salts of protoxide of mercury, which are insoluble in water, can, for the most part, be dissolved in diluted nitric acid. The acid solution produces with muriatic acid a white precipitate, which ammonia turns black but does not dissolve.

"The salts of the protoxide are thus distinguished in the dry way and in solution."—*Rose's Analytical Chemistry, translated by Griffin.*

Peroxide of mercury is red, a gentle heat turns it black, but the original colour returns when the heat is diminished. A strong heat decomposes it, and oxygen gas and metallic mercury are afforded.

"*Hydrosulphuret of ammonia,* when dropped in very small quantities into solutions of peroxide of mercury, produces, where it comes into contact with the liquid, a black precipitate. But this precipitate becomes completely white when the mixture is shaken, even though much of the salt of mercury remains in solution undecomposed. The white precipitate, formed by agitating the black one in the liquid, remains a very long time in suspension. If more hydrosulphuret of ammonia is gradually added to the solution, the resulting precipitate is a mixture of black and white; and if an excess of the precipitant is added, the precipitate, which does not re-dissolve in the cold, is rendered perfectly black. The precipitate is also insoluble in ammonia, but it dissolves completely in a solution of potash. It can be reprecipitated from the alkaline solution by supersaturating it with an acid.

"Solution of sulphuretted hydrogen, or a current of sulphuretted hydrogen gas, acts in the same way, but more delicately.

"The salts of peroxide of mercury, which are insoluble in water, nearly all dissolve in acids, and then the above test may be applied."—*Rose's Analytical Chemistry, translated by Griffin.*

The persalts, like the protosalts, are reduced to metallic mercury by being treated as above with soda.

Mr. Rose considers the test of hydrosulphuret of ammonia, or what is better, that of sulphuretted hydrogen, sufficient to recognize the salts of the peroxide; but there are, of course, in this, as in all other cases, an abundance of collateral tests, all of which we have not room to enumerate.

Corrosive sublimate may be detected in solution by the above test. Another test for this substance is to place a drop of a solution of it on a piece of polished gold, and to touch the gold through the solution with a piece of iron wire, or the point of a penknife, by which method the gold at the part touched appears white from an amalgam of gold being formed. Mr. Sylvester proposed this process in a more complicated form originally, and it has been thus simplified by Dr. Paris.

If corrosive sublimate be submitted to heat in a glass tube, it sublimes in white acrid fumes, which condense in the cool part of the tube, the original substance being unaltered in its properties.

Lime-water is made use of as a test for corrosive sublimate, with which it produces, according to the quantity added, either a yellow or a brick-dust coloured precipitate (peroxide of mercury), which may be reduced to the metallic state as above. Solution of pure potash acts in a similar way to lime-water.

See *Christison's Treatise on Poisons* for the detection of compounds of mercury in mixed fluids.

Cyanuret of mercury affords cyanogen gas, and metallic mercury when heated in a glass tube, as described under *Hydrocyanic Acid*, page 425.

MUCUS.—The manner of distinguishing mucus from pus is described at page 364.

OILS.—The fixed and volatile oils are distinguished from each other as described at pages 205 and 208.

OPIUM. See *Meconic Acid*, page 426.

POTASH.—If tartaric acid be added in excess to any salt of potash in solution, or pure potash, a precipitate of bitartrate of potash is thrown down. If solution of muriate of platinum be added to any salt of potash in solution, a yellow precipitate, *muriate of platinum and potash*, is thrown down. These tests are sufficient to distinguish potash and its salts from soda and its salts, as no re-agent will throw down a precipitate with soda and its salts, and no other re-agent acts upon potash or its salts but the two above-mentioned. In a solid state the salts of potash, if not permanent, are deliquescent, while those of soda are efflorescent.

PUS.—See page 364 for the manner of distinguishing pus from mucus.

SILVER.—This metal is precipitated in a metallic state from its solutions by most other metals. With muriatic acid, or any muriate in solution, nitrate of silver affords a white precipitate, *chloride of silver*, which becomes dark on exposure to light, and is insoluble in the diluted acids but soluble in ammonia.

SODA.—See *Potash*.

TANNIN.—See page 200.

ZINC.—By pure potash, or ammonia, this metal is precipitated from its solutions as a white hydrated oxide, which is soluble if the alkaline solution be added in excess. The carbonates of soda and potash throw down a precipitate, *carbonate of zinc*, which is insoluble in an excess of the precipitant. Carbonate of ammonia also throws down carbonate of zinc, which it dissolves on being added in excess.

ON THE TREATMENT OF POISONS.

Orfila, the French toxicologist, arranges all the known poisons under four classes, and his arrangement has been adopted by other writers on the subject. A perfectly correct classification of the different kinds of poisons is however a *desideratum*, and is likely to remain so, in consequence of the numerous intricacies in which this branch of medical science is involved.

Class 1st. *Irritant* or *acrid poisons*, or such as produce inflammation of the parts with which they come in contact.

—— 2d. *Narcotic* or *stupefying poisons*. These act by producing derangement of the nervous system.

—— 3d. *Narcotico-acrid poisons*. These produce a local irritating effect, like those of the first class, and a remote effect on the nervous system, like those of the second class.

—— 4th. *Septic* or *putrefiant poisons*. This class is objectionable, because, as Dr. Christison very justly observes, "no poison can cause putrefaction in the living body." Septic poisons may, therefore, be placed under one of the three preceding classes.

CLASS I.

Irritant or Acrid Poisons.

This class comprises:—

The concentrated acids.

———— —— alkalies.

Carbonated alkalies.

Corrosive sublimate and other mercurial preparations.
White arsenic, and all other arsenical compounds.
Verdigris, and the other salts of copper.
Tartar emetic, and other antimonial preparations.
Oxides and salts of tin.
——————— gold.
——————— bismuth.
——————— zinc.
——————— lead.
Nitrate of silver.
——— potash.
Muriate of ammonia.
Liver of sulphur.
Salts of baryta.
Phosphorus.
Iodine, and hydriodate of potash.
Powdered glass.
Cantharides.
Quick lime.

Irritant or Acrid Vegetable Poisons.

Aconitum napellus. *Monk's-hood. Wolf's-bane.*
Anemone pulsatilla. *Wind flower.*
Bryonia diöica. *Bryony,*
Chelidonium majus. *Celandine.*
Clematis vitalba. *Virgin's bower, or traveller's joy.*
Colchicum autumnale. *Meadow saffron.*
Convolvolus scammonea. *Scammony.*
Cucumis colocynthis. *Colocynth. Bitter apple.*
Daphne mezereum. *Mezereon.*
———-gnidium. *Spurge flax.*
Delphinium staphysagria. *Stavesacre.*
Euphorbia officinarum. *Euphorbium.*
Fritillaria imperialis. *Crown imperial.*

Gratiola officinalis. *Hedge hyssop.*
Helleborus niger. *Black hellebore. Christmas Rose.*
Jatropha curcas. *Barbadoes-nut.*
Juniperus sabina. *Savine.*
Momordica elaterium. *Squirting cucumber.*
Narcissus pseudo-narcissus. *Daffodil.*
Ranunculus acris. *Crow foot. Butter-cups.*
Rhus radicans. (*Toxicodendron*). *Sumach. Poison oak.*
Ricinus communis. *Palma christi. Castor oil plant.*
Scilla maritima. *Squill.*
Sedum acre. *House-leek.*
Stalagmitis gambogiöides. *Gamboge.*
Veratrum album. *White hellebore.**
&c. &c.

1. *Treatment of the concentrated Acids.*†

ACID MURIATIC. *Spirit of salt.*—Give soap dissolved in hot water, or calcined magnesia. Orfila and other writers also recommend chalk; but this is not by any means proper, because muriate of lime, which would be formed, is poisonous.

ACIDS, NITRIC and NITROUS.—Treat these in the same way as *muriatic acid.*

ACID, OXALIC.—Chalk, or, if not at hand, the scrapings of a white-washed wall or cieling, mixed in water, and given in sufficient quantity, is the best antidote, the oxalate of lime thus formed in the stomach being insoluble and inert. We must, however, not give lime in its caustic state. Next to chalk, or carbonate of lime, magnesia is the best antidote.

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* Besides the plants named in the above list, other species of some are mentioned in the original.

† The stomach pump may be employed to remove several poisons from the stomach; but when the poison can be acted upon by a direct antidote, or counterpoison, the instrument in question ought not to be used.

Acid, sulphuric. *Oil of vitriol.*—Treat this exactly like oxalic acid. Soap may also be employed to neutralize this acid.

2. *Treatment of Alkalies, Earths, &c.*

Ammonia, potash, and soda, or the *carbonates* of these alkalies, are counteracted by vinegar or lemon juice. or oils which form soaps

Baryta.—The muriate and carbonate of baryta are to be treated as the salts of lead. See *Lead.*

Lime.—Should this be taken in a caustic state, give vinegar or lemon juice.

Nitre.—When this has been taken in large doses, treat it in the manner recommended under arsenic.

3. *Treatment of Metallic Preparations.*

Antimony.—Tartar emetic, and the other antimonial preparations, are to be treated by giving plenty of warm water, and tickling the throat with the finger to excite vomiting. While this is doing, prepare a strong decoction of gall-nuts, which should be given as soon as possible. If gall-nuts are not at hand, any other astringent vegetable decoction may be resorted to. After the poison is evacuated, opium will allay the vomiting. If any strong symptoms of inflammation of the stomach arise, bleeding must be resorted to.

Arsenic.—For white arsenic, and all the other preparations of arsenic, there is no direct counterpoison or antidote. All we can do is to assist the vomiting, which is more or less present, by giving large and continued doses of sugar and water, soap and water, and demulcent drinks. Should the fatal consequences of this poison thus be prevented, let the patient, for some time afterwards, abstain from animal food in a solid form: his diet should be milk and demulcents.

BISMUTH.—Treat salts of bismuth like *arsenic.*

COPPER.—Verdigris, and all the salts of copper, may be treated exactly the same as *corrosive sublimate.* Sugar and water may be useful, but it is not a counter-poison.

CORROSIVE SUBLIMATE. *Oxymuriate,* or *perchloride of mercury.*—When this or any of the other poisonous compounds of mercury have been taken give whites of eggs: the corrosive sublimate is thus decomposed, and a white compound, composed of calomel and albumen, is formed, which is inert. The whites of eggs should be beaten up with water and given repeatedly. Milk may be used if eggs are not at hand. Vomiting may then be excited by irritating the throat with a feather or with the finger.

GOLD.—Treat salts of gold like *arsenic.*

LEAD.—The salts of this metal are counteracted by sulphate of soda, or sulphate of magnesia, the sulphate of lead formed being insoluble and inert. When paralysis or *colica pictonum* are produced by the absorption of lead into the system, these diseases must be treated according to the mode recommended in medical works.

SILVER.—Nitrate of silver, which is the only salt of silver that is likely to be taken in this country, is at once counteracted by a solution of common salt, the chloride of silver formed being insoluble and inert.

TIN.—The salts of tin are to be counteracted by large and repeated doses of milk. Warm or cold water may also be given to excite or assist vomiting.

ZINC.—Treat salts of zinc like arsenic.

4. *Treatment of the Irritant Vegetable Poisons enumerated above.*

As there is no specific antidote for poisons of this kind, all we can do is to remove the deleterious substance from the stomach as soon as posssble, by assisting the vomiting, or desire to vomit, with the use of mucilaginous drinks, sugar and water, &c. and then to subdue inflammatory action in the usual way. In short, we must treat the case in question according to the symptoms which present themselves. Should vomiting not take place, we can only excite it by the use of diluents, and irritating the throat with the finger. Irritant emetics, such as sulphate of zinc, would only aggravate the case, and therefore should not be given.

CLASS II.

Narcotic, or Stupefying Poisons.

This class comprises the following:—

Opium.
Hyoscyamus niger. *Black henbane.*
———— albus. *White henbane.*
Hydrocyanic, or prussic acid, and vegetables containing it, viz.
Prunus lauro-cerasus. *Cherry laurel.*
Amygdalus communis. *Bitter almonds.*
———— persica. *The peach.* Its kernels, leaves, and flowers.
Prunus avium. *Black cherry.* Its kernels.
——— padus. *Bird cherry.* Its bark.
Lactuca virosa. *Strong-scented lettuce.*
The *solana.*
Taxus baccata. *The yew.*
Ervum ervilia. *The lentil.*
Paris quadrifolia. *Herb Paris.*
&c.

1. *Treatment of poisoning by Opium, &c.*

Opium, or its *Tincture,* should be first removed from the stomach, by giving an emetic of sulphate of zinc dissolved in a little water, and not in a large quantity of water, as is usually the custom. The throat should be tickled with the finger, if the patient can be persuaded to do it; but if vomiting cannot under these circumstances be excited, repeat the emetic of sulphate of zinc after the former dose has been taken about a quarter of an hour, or gr. viij. of sulphate of copper may be administered. Copious draughts of fluids ought by no means to be given, as the object is to have these antidotes in as concentrated a state as possible. Vinegar and acidulated drinks, which, before the poison be removed, would only increase its energy, may afterwards be resorted to with considerable advantage. When laudanum or opium has been long taken and comatose symptoms are present, blood-letting from the jugular vein or arm is recommended by Orfila, which should be accompanied at intervals, with small doses of the sulphate of zinc, and the bowels ought to be freely evacuated with a clyster of strong infusion of senna and Epsom, or Glauber's salts, to a pint of which, gr. iv. of tartarized antimony may be added. In confirmation of bleeding being advantageous, see an interestiug case related by W. M Ross, Esq., in the Edinburgh Journal for April 1823. The dashing of cold water over the body has been found serviceable. A little cowhage rubbed on different parts of the body might assist in keeping the patient awake.

⁂ All the other narcotic poisons are to be treated similarly to opium, except hydrocyanic acid, and the parts of plants containing it; see as follows:—

2. *Treatment of poisoning by Hydrocyanic Acid, &c.*

There is no specific antidote for this acid in a chemical point of view, because all the compounds which it forms with bases are poisonous. If it has been taken in a concentrated state, instantaneous death will be the consequence; but if taken in a dilute state, or if parts of plants containing it, or oils or waters prepared from such parts, have been taken, or if its vapour has been inhaled, its effects are said to be overcome, by applying a bottle containing a tolerably strong solution of ammonia, or a solution of chlorine, to the nostrils. Neither chlorine nor ammonia are of use taken into the stomach; it is only by inhalation that they prove serviceable. Cold affusion has also been strongly recommended.

CLASS III.

Narcotico-acrid Poisons.

This class includes:—

1. Poisonous mushrooms, of which there are several varieties.
2. Strychnos nux vomica, and other species of *strychnos*.

   Brucea antidysenterica. *False angustura.*

   The *upas tieute*, a Javanese poison, in form of a bitter, milky juice, known only in this country as an article of curiosity, and sometimes confounded with the *upas lieutè*, another Javanese poison, the produce of the *strychnos tieutè*, one of the species of strychnos alluded to above. These poisons are used for arming darts and other instruments of war.

   The *ticunas*, or American poison.

   The *woorara*, employed by the Indians of Guiana for arming their darts or arrows.

   Camphor.

   Cocculus indicus. The fruit of the *menispermum cocculus*.

3. Nicotiana tabacum. *Tobacco.*
Conium maculatum. *Hemlock.*
Cicuta virosa *Water hemlock.*
Atropa belladonna. *Deadly nightshade.*
Datura stramonium. *Thorn apple.*
Digitalis purpurea. *Purple fox-glove.*
Ruta graveolens. *Rue.*
Lolium temulentum. *Darnel.*
Hippomane mancinella. *Manchineel tree.*
Aristolochia clematitis. *Common birthwort,* &c.
4. Spirituous liquors and wines.
5. Emanations from flowers.
6. Secale cornutum. *Ergot of rye.*
&c.

1. *Treatment of poisoning by Mushrooms.*

The effects of poisonous mushrooms in general do not begin to appear till five, seven, twelve, or twenty-four hours after they have been eaten. We can only counteract their effects by the use of emetics, cathartics, and clysters.

2. *Treatment of Poisons of the second of the above Divisions, namely, Nux Vomica, &c.*

In cases of wounds from these poisons, the actual cautery should be resorted to, and a ligature should be applied above the wounded part. When they have been taken internally they will require to be treated with emetics. The impeded respiration must next be attended to, as this is the principal cause of death. It may become necessary to inflate the lungs, and in very severe cases to resort to the operation of bronchotomy. Orfila recommends the following mixture to be taken in doses of two spoonfuls every ten minutes: one dram of æther, two drams of oil of turpentine, half an ounce of sugar, and two ounces of water.

3. *Treatment of Poisons of the third of the above Divisions, viz. Tobacco, &c.*

An emetic of sulphate of zinc should be administered, if vomiting does not take place, and the vomiting should be encouraged by giving demulcent drinks. If any symptoms of cerebral congestion should be present it will be necessary to bleed. After the poison is removed from the stomach, acidulated drinks will be of service. We shall sometimes find it necessary, especially when the poison has been long taken, to give cordials, and stimulants; but in this we must of course be guided by the symptoms.

4. *Treatment of Spirituous Liquors taken in excess.*

Excite vomiting as soon as possible, or employ the stomach-pump. After vomiting has taken place, vinegar and water, or lemon juice and water, may be given to drink, and the body, if cold, should be placed in a situation to become warm. Sometimes the pulse is scarcely perceptible, in such cases ammonia will prove serviceable. It may be necessary to bleed from the arm or jugular vein; from the latter is preferable, when there is much cerebral congestion.

5. *Emanations from Flowers.*

Some people are so affected by the odour of several flowers, that they cannot remain in an apartment containing them with impunity. Remove the patient into fresh air, and if in a state of syncope treat him accordingly. If in convulsions, give him antispasmodics.

6. *Of horned or spurred Rye.*

Rye suffers frequently from a disease by which its form and composition become altered, and its properties poisonous. It is covered with a violet-coloured skin, and is bent and lengthened into the form of a spur or horn; to this the name of *ergot* has been applied, and in French the rye is said to be *ergoté*. Such grains break short with a slight sound, like a dry almond. When reduced to powder they have a disagreeable smell and an acrid taste, resembling bad wheat. The bread and sometimes the dough containing *ergoted* rye has a number of violet-coloured spots, and is exceedingly unwholesome, producing the most alarming symptoms when eaten. The effects of the substance in question are scarcely known in this country, but on the continent they have occasionally produced the most dreadful ravages.

A difference of opinion exists respecting the cause of the production of the spur of rye. "Some authors," says Dr. Christison, "believe that nothing else is required but undue moisture combined with warmth, and that under these circumstances the spur is formed simply by a diseased process from the juice of the plant. Others (and particularly in recent times *Decandolle*) maintain that the disorder is in reality caused by the growth of a fungus, a species of *sclerotium*, which vegetates at the expense of the germen. Others again, and these the most numerous party, assert that it is the work of an insect, a species of butterfly; and in support of that doctrine, *Fontana, Réad, Tillet,* and others, aver that they have found the ova and larvæ of the insect in the spur. Allied to their statements are the observations recently made in America by *General Martin Field,* who having observed flies puncturing the glumes of the rye during its milky state, imitated the process by puncturing them with a needle, and found that in both cases the juice exuded, and the peduncle exhibited in four days a little black point which gradually became a spur. I mention these various doctrines regarding the origin of the disease, without pretending to say which is the correct one. But the remarks of General Field seem to possess internal evidence of accuracy, and give a very rational account of the matter."

Medical uses of spurred rye.—Spurred rye has long been known in Germany to possess the property of causing the gravid uterus to contract, and has accordingly been employed there by midwives and empirics to a great extent. In the United States it has been used since 1807 by accoucheurs for facilitating the contractions of the uterus, when unusually languid; and for assisting the expulsion of the placenta, and the contraction of the uterus after delivery has taken place; and its use is now gaining ground amongst practitioners in this country. It is given in doses of ʒss.

As cases of poisoning by spurred rye are unknown in this country, we refer the reader to Orfila on the subject.

CLASS IV.

Septic or Putrefiant Poisons.

This class of Orfila comprises

1. The viper, and all other animals, the bite or sting of which occasions symptoms more or less dangerous.
2. Fish, and other animals that prove hurtful after being eaten.
3. The malignant pustule, and the bite of a mad dog or any other rabid animal.

1. *Treatment of the Bite of the Viper, &c.*

Place a ligature rather tight just above the bitten part: it must, however, not be too narrow so as to irritate the skin, nor should its application be continued too long, as it may give rise to gangrene. If the wound should not bleed, cause it to do so by gentle pressure, which will assist the expulsion of the poison. Sucking the wound, in such cases, will perhaps be the best remedy; this may be done with safety, as such poisons, even if they get into the stomach, are not in the least hurtful. Immersing the bitten part in warm water is also recommended. The swelled parts surrounding the wound should be anointed with a mixture of oil and solution of ammonia. Scarifications should not be made, for they frequently aggravate the symptoms. The *actual cautery*, as well as the ordinary caustic applications have all been resorted to, and are recommended in these cases. In applying the actual cautery, the iron should be made as hot as possible, because the greater the degree of heat, the less will be the pain, and the more certain the success of the operation.

At the same time we must endeavour to promote perspiration and sleep by the proper exhibition of internal remedies; and antispasmodics will also be required.

2. *Treatment of unpleasant Symptoms produced by eating certain Fish and other Animals.*

Emetics, aperients, and glysters must be employed, and after they have acted, antispasmodics will be of service. Should fever supervene, it must be treated in the usual way.

3. *Of the Treatment of Malignant Pustule, and the Bite of Rabid Animals.*

As this is not the place to enter into any detail in respect to the treatment of malignant pustule, a disease to which butchers, farriers, and those who handle putrefied meat are liable, we refer our readers to *Cooper's Surgical Dictionary*, and other works of a similar nature.

The Bite of a Mad Dog may be treated locally, to prevent the disease establishing itself, in the same way as the bite of the viper, page 458; but as to the use of internal remedies, when the system has become affected, it is universally agreed that none can be considered as possessing specific properties: notwithstanding, I am led to believe that the exhibition of strychnia might be of service, although I have had no opportunity of witnessing its effects in such cases.

A TABLE OF PHARMACEUTICAL EQUIVALENTS, OR ATOMIC WEIGHTS.

Acid, acetic (dry)........	4 carbon 3 oxygen 2 hydrogen	= 50*
——— (crystallized or glacial)	1 dry acid 1 water	= 59 or 60
—— arsenious (dry)....	1 arsenic 2 oxygen	= 54†
—— benzoic (dry)......	15 carbon 3 oxygen 6 hydrogen	=120
—— boracic (dry)......	1 boron 2 oxygen	= 24
——— (crystallized)	1 dry acid 2 water	= 42
—— carbonic (dry)	1 carbon 2 oxygen	= 22
—— citric (dry)	4 carbon 4 oxygen 2 hydrogen	= 58
——— (crystallized)	1 dry acid 2 water	= 76

* According to Dr. Prout the oxygen and hydrogen in this acid are in the exact proportions for forming water, and it contains 47.05 per cent. of carbon, so that it may be considered a compound of $\left\{\begin{array}{l}4\text{ carbon}\\3\text{ oxygen}\\3\text{ hydrogen}\end{array}\right\}=51.$

† See page 132.

Acid, hydriodic (dry)...	1 iodine 1 hydrogen	=125
—— hydrocyanic (dry)	1 cyanogen 1 hydrogen	= 27
—— muriatic (dry)	1 chlorine 1 hydrogen	= 37
—— nitric (dry)........	1 azote 5 oxygen	= 54
———— (liquid, sp. gr. 1.500)......	1 dry acid 2 water	= 72
—— oxalic (dry)	2 carbon 3 oxygen	= 36
———— (crystallized)	1 dry acid 3 water	= 63
—— phosphoric (dry) Thomson	1 phosphorus 2 oxygen	= 28*
———— Berzelius	1 phosphorus $2\frac{1}{2}$ oxygen	=35.71*
—— succinic (dry, or anhydrous crystals).............	4 carbon 3 oxygen 2 hydrogen	= 50
—— sulphuric (dry)....	1 sulphur 3 oxygen	= 40
———— (liquid, sp. gr. 1.4838)	1 dry acid 1 water	= 49
—— tartaric (dry)	4 carbon 5 oxygen 3 hydrogen	= 67
———— (crystallized)	1 dry acid 1 water	= 76

* See phosphorus.

Alum (dry) Thomson	3 sulphate of alumina 1 sulphate of potash		=262*
—— (crystallized)...... Thomson	1 alum 25 water		=487*
Aluminum			= 10
Alumina			= 18
—— sulphate (dry)	1 sulph. acid 1 alumina		= 58
Ammonia	1 azote 3 hydrogen		= 17
—— acetate (dry)	1 ammonia 1 acetic acid		= 67
—— hydrated bi-carbonate..	1 ammonia 2 carbonic acid 1 water		= 70
—— carbonate....	1 ammonia 1 carbonic acid		= 39
—— hydrated sesquicarbonate (the *ammonia subcarbonas* of the Pharmacopœia) ..	2 ammonia 3 carbonic acid 2 water		=118
—— citrate (dry)..	1 ammonia 1 citric acid		= 75
—— muriate	1 ammonia 1 muriatic acid		= 54

* According to Phillips {2 sulphate of alumina, 1 bisulphate of potash} and 25 atoms of water when crystallized.

Ammonia, sulphate (hydrated)	1 ammonia 1 sulph. acid 1 water	= 66
Antimony...		= 44
——— chloride......	1 antimony 1 chlorine	= 80
——— protoxide	1 antimony 1 oxygen	= 52
——— deutoxide, or antimonious acid.........	1 antimony $1\frac{1}{2}$ oxygen	= 56
——— peroxide, or antimonic acid	1 antimony 2 oxygen	= 60
——— hydrosulphuret of protoxide..	1 protoxide of antimony 1 bisulphuretted hydrogen	= 86
——— sulphuret.....	1 antimony 1 sulphur	= 60
——— potash tartrate (crystallized) the *antimonium tartarizatum* of the Pharmacopœia .... Thomson	3 protoxide of antimony 1 potash 2 tartaric acid 2 water*	=354
Arsenic		= 38
——— Oxides of, or acids, see page 132.		
Azote, or nitrogen.................................		= 14

* Mr. Phillips states 3 atoms of water, making the atomic weight of the crystallized salt 363.

Barium		= 70
—— oxide (the earth *baryta*)	1 barium 1 oxygen	= 78
Bismuth		= 72
—— oxide	1 bismuth 1 oxygen	= 80
—— subnitrate	2 oxide of bismuth 1 nitric acid	= 214
Boron		= 8
Calcium		= 20
—— chloride	1 calcium 1 chlorine	= 56
—— oxide (lime)	1 calcium 1 oxygen	= 28
Carbon		= 6
Carburet of azote (cyanogen)	2 carbon 1 azote	= 26
Chlorine		= 36
Copper		= 64
—— acetate of peroxide (dry)	1 peroxide of copper 1 acetic acid	= 130
—— —— (crystallized common verdigris)	1 peracetate 6 water	= 184
—— binacetate (dry)	1 peroxide 2 acetic acid	= 180
—— —— (crystallized, or distilled verdigris)	1 binacetate 3 water	= 207

Copper, protoxide	1 copper 1 oxygen	= 72
—— peroxide........	1 copper 2 oxygen	= 80
—— bisulphate (dry)	1 peroxide of copper 2 sulph. acid	=160
—— (crystallized blue vitriol)	1 persulphate 10 water	=250
Hydrogen..		= 1
Iodine..		=124
Iron		= 28
—— protoxide..........	1 iron 1 oxygen	= 36
—— peroxide	1 iron $1\frac{1}{2}$ oxygen	= 40
—— protochloride......	1 iron 1 chlorine	= 64
—— perchloride........	1 iron $1\frac{1}{2}$ chlorine	= 82
—— sulphate of protoxide (dry)......	1 protoxide 1 sulph. acid	= 76
—— (crystallized green vitriol)	1 dry sulphate 7 water	=139
Lead..		=104
—— acetate (dry)	1 protoxide 1 acetic acid	=162
—— (crystallized)	1 dry acetate 3 water	=189
——subacetate, Berzelius	3 protoxide 1 acetic acid	=386

Lead, protoxide	1 lead 1 oxygen	=112
—— carbonate..........	1 protoxide 1 carbon. acid	=134
—— deutoxide	1 lead $1\frac{1}{2}$ oxygen	=116
—— peroxide	1 lead 2 oxygen	=120
Lime.....................	1 calcium 1 oxygen	= 28
—— carbonate..........	1 lime 1 carbon. acid	= 50
—— hydrate (slaked lime)............	1 lime 1 water	= 37
—— phosphate	1 lime 1 phosph. acid	= 63.71
—— sulphate (dry)	1 lime 1 sulph. acid	= 68
—— tartrate (dry)	1 lime 1 tartaric acid	= 95
Magnesium		= 12
————oxide(the earth *magnesia*)....	1 magnesium 1 oxygen	= 20
Magnesia carbonate (dry *subcarbonate* of the Pharmacopœia).......	1 magnesia 1 carbon. acid	= 42
———— sulphate (dry)	1 magnesia 1 sulph. acid	= 60
————————(crystallized)	1 dry sulphate 7 water	=123
Mercury		=200

Mercury, protoxide	1 mercury 1 oxygen	=208
——— peroxide......	1 mercury 2 oxygen	=216
——— protochloride (calomel)..	1 mercury 1 chlorine	=236
——— perchloride (corrosive sublimate)..	1 mercury 2 chlorine	=272
——— protosulphate (dry)........	1 protoxide 2 sulph. acid	=248
——— persulphate (dry)........	1 peroxide 1 sulph. acid	=296
———protosulphuret	1 mercury 1 sulphur	=216
——— bisulphuret ..	1 mercury 2 sulphur	=232
——— cyanuret	1 mercury 2 cyanogen	=252
——— protonitrate (dry)........	1 protoxide 1 nitric acid	=262
—————(crystal- lized)	1 dry protonit. 2 water	=280
Nitrogen, or azote..............................		= 14
Oxygen		= 8
Phosphorus ....Thomson..		= 12
——— ....Berzelius..		=15.71
Potash (dry)	1 potassium 1 oxygen	= 48
——— (hydrate) the *po- tassa fusa* of the Pharmacopœia	1 potash 1 water	= 57

Potash, acetate (dry) ..	1 potash 1 acetic acid	= 98
—— arsenite (dry) ..	1 potash 1 arsenious acid	=102
—— arseniate (dry)..	1 potash 1 arsenic acid	=110
—— bicarbonate(dry)	1 potash 2 carbonic acid	= 92
—— (crystallized *potassæ carbonas* of the Pharmacopœia)........	1 dry bicarbonate 1 water	=101
—— bisulphate (dry)	1 potash 2 sulph. acid	=128
—— —— (crystallized)	1 dry bisulph. 2 water	=146
—— bitartrate (dry)	1 potash 2 tartaric acid	=182
—— —— (crystallized cream of tartar)	1 dry bitartrate 2 water	=200
—— carbonate(dry *potassæ subcarbonas* of the Pharmacopœia)	1 potash 1 carbon. acid	= 70
—— citrate (dry)	1 potash 1 citric acid	=106
—— nitrate	1 potash 1 nitric acid	=102
—— sulphate	1 potash 1 sulph. acid	= 88

Potash, tartrate (dry)...	1 potash, 1 tartaric acid	=115
Potassium..		= 40
——— chloride......	1 potassium 1 chlorine	= 76
——— sulphuret.....	1 potassium 1 sulphur	= 56
——— bisulphuret...	1 potassium 2 sulphur	= 72
Silver..		=110
——— oxide..........	1 silver 1 oxygen	=118
——— chloride.........	1 silver 1 chlorine	=146
——— nitrate..........	1 oxide of silver 1 nitric acid	=172
Soda (dry)...............	1 sodium 1 oxygen	= 32
—— (hydrate).........	1 soda 1 water	= 41
—— acetate (dry).......	1 soda 1 acetic acid	= 82
———— (crystallized)	1 dry acetate 6 water	=136
—— carbonate (dry)....	1 soda 1 carbon. acid	= 54
———— (crystallized *sodæ subcarbonas* of the Pharmacopœia).........	1 dry carbon. 11 water	=153

Soda, citrate (dry)......	1 soda 1 citric acid	= 90
—— sulphate (dry)	1 soda 1 sulph. acid	= 72
———— (crystallized)..	1 dry sulphate 10 water	=162
—— tartrate (dry)......	1 soda 1 tartaric acid	= 99
—— potash tartrate (*soda tartarizata* of the Pharmacopœia) ..	1 soda 1 potash 2 tartaric acid	=214
—— hydrated sesquicarbonate (*soda carbonas* of the Pharmacopœia)	2 soda 3 carbon. acid 4 water	=166
—— bicarbonate........	1 soda 2 carbon. acid	= 76
Sodium		= 24
——— chloride (common salt).....	1 sodium 1 chlorine	= 60
——— oxide (soda)....	1 sodium 1 oxygen	= 32
Sulphur		= 16
Sulphuretted hydrogen	1 sulphur 1 hydrogen	= 17
Bisulphuretted hydrogen	2 sulphur 1 hydrogen	= 33
Tin		= 58
Water	1 oxygen 1 hydrogen	= 9
Zinc..		= 34

Zinc oxide	1 zinc 1 oxygen	= 42
—— carbonate..........	1 oxide 1 carbon. acid	= 64
—— sulphate (dry)	1 oxide 1 sulph. acid	= 82
———— (crystallized)..	1 dry sulphate 7 water	=145

ADDENDUM.

When the sheet containing the note under *Cuprum ammoniatum*, page 137, was just going to press, the following remarks respecting that preparation were met with in the new edition (1831) of Mr. Phillips's translation of the London Pharmacopœia, and the liberty is taken to insert them in this place:—

" When the sulphate of copper is mixed with the subcarbonate (sesquicarbonate) of ammonia, double decomposition takes place, sulphate of ammonia and carbonate of copper being formed; this, at least, is what I now believe to occur, though I formerly thought that subsulphate of copper was one of the new compounds resulting from the mutual action of these salts. Effervescence arises during the trituration, from two causes: the sulphate of copper contains excess of acid, and so also does the sesquicarbonate of ammonia, and there being, consequently, more carbonic acid set free, than the peroxide of copper can combine with, it is evolved in the gaseous state.

" This preparation, however, is usually not a mere mixture of carbonate of copper and sulphate of ammonia, for the ammonia of the subcarbonate is sufficient to saturate three times the quantity of sulphuric acid in the sulphate of copper; there is probably, therefore, some excess of subcarbonate of ammonia, the proportion of which must depend upon the temperature at which the medicine is dried."

ROYAL COLLEGE OF SURGEONS, LONDON.

The Regulations of the Council of the Royal College of Surgeons require Candidates for Examination to have attended the following Lectures:

Anatomy and Demonstrations: during two Anatomical Seasons.

An Anatomical Season is understood to extend from October to April inclusive.

Principles and Practice of Surgery: Two Courses.

Practice of Physic: Two Courses.

Chemistry: Two Courses.

Midwifery: Two Courses.

Botany: One Course.

Materia Medica: One Course.

The Candidate must also have attended during twelve months the surgical practice of a recognised Hospital in London, Dublin, Edinburgh, Glasgow, or Aberdeen; or for six months in any one of such Hospitals, and twelve months in any properly constituted provincial Hospital, acknowledged by the Council as competent for the purposes of instruction.

It is earnestly recommended that Candidates shall have studied Anatomy, by attendance on lectures and demonstrations and by dissections, for one anatomical season prior to their attendance on the surgical practice of an Hospital.

APOTHECARIES' HALL, LONDON.

The Regulations of the Court of Examiners of the Apothecaries' Hall require Candidates for Examination to have attended the following Lectures : —

Chemistry : Two Courses.

Materia Medica and Therapeutics : Two Courses.

Anatomy and Physiology : Two Courses.

Anatomical Demonstrations : Two Courses.

Principles and Practice of Medicine : Two Courses. — The first course on this subject, to be attended subsequently to the termination of the first Course of Lectures on Chemistry, Materia Medica, Anatomy and Physiology.

Botany : One Course.

Midwifery, and the Diseases of Women and Children : Two Courses : To be attended during the second year.

Forensic Medicine : One Course : To be attended during the second year.

Students are moreover recommended diligently to avail themselves of instruction in *Morbid Anatomy.*

The Candidates must also have attended for *Twelve Months*, at least, the Physician's Practice at an Hospital containing not less than sixty beds, and where a Course of Clinical Lectures is given ; or for *Fifteen Months* at an Hospital wherein Clinical Lectures are not given ; or for *Fifteen Months* at the Dispensary connected with some Medical School recognized by the Court. The whole of such attendance to be subsequent to the first year of attendance on Lectures.

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THE END.

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[illegible]