

A manual of pharmacy, for the student of veterinary medicine ; containing the substances employed at the Royal Veterinary College, with an attempt at their classification, and the pharmacopoeia of that institution / [William John Thomas Morton].

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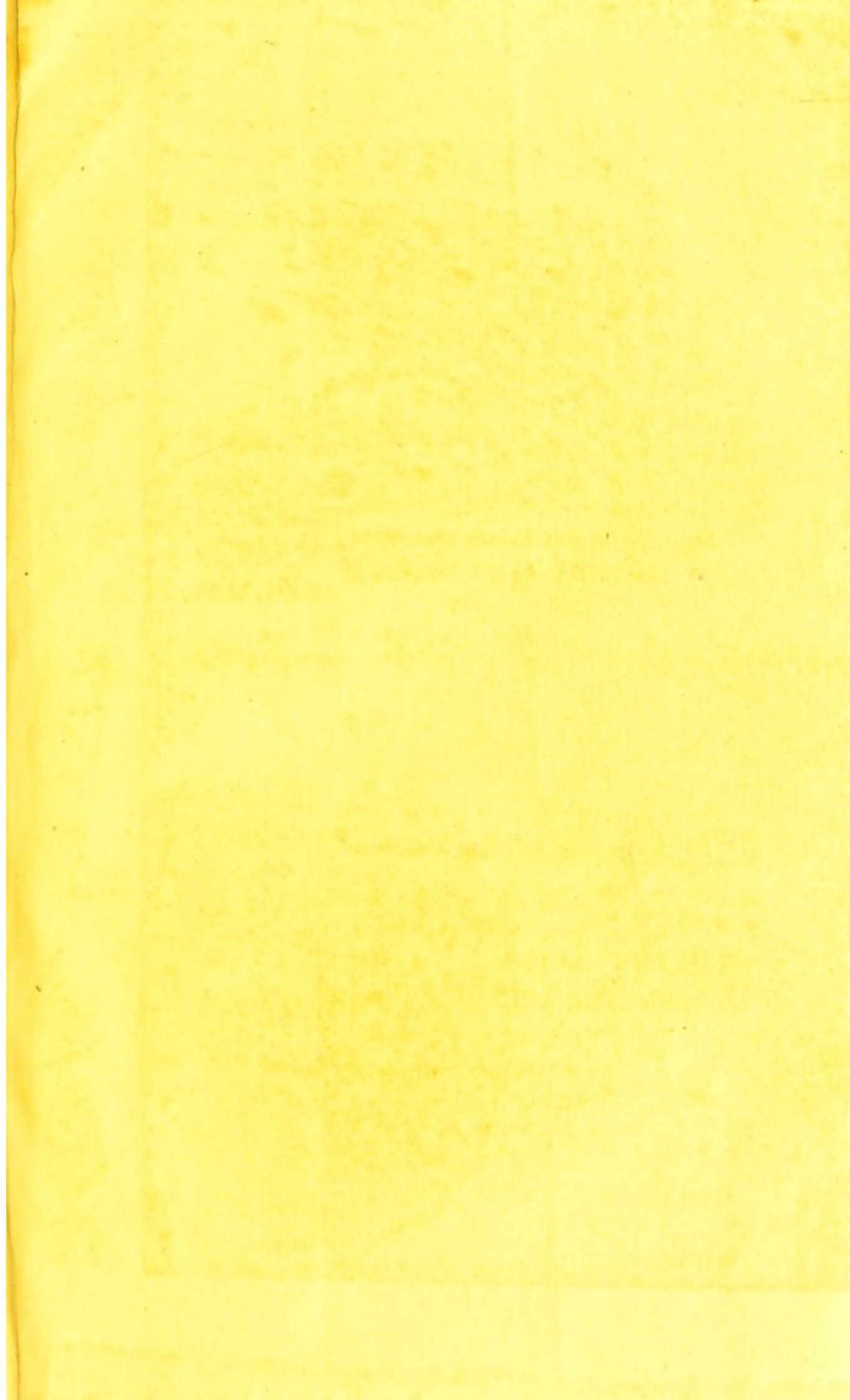
A
MANUAL
OF
VETERINARY
PHARMACY

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MORTON, W. J. T.
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AN ARRANGEMENT OF THE MEDICINAL SUBSTANCES USED IN VETERINARY PRACTICE, WITH MANY OF THEIR COMPOUNDS, ACCORDING TO THEIR THERAPEUTIC PROPERTIES.

Internally administered.

Medicines which act upon the Alimentary Canal or its Contents.	CATHARTICS	Agents which cause a quicker expulsion of the faeces in a semi-fluid state	Aloes, Croton, Chloride of Mercury, Linseed Oil, Clysters, Mashies, Sulphur, Sulphates of Magnesia and Soda.
	ANTHELMINTICS	Agents which destroy or expel worms	Nearly the whole of the above; Potassio-tartrate of Antimony.
	NAUSEANTS	Agents which induce a disposition to vomit.	Aloes, White Hellebore.
	ANTACIDS	Agents which counteract acidity in the primæ viæ.	Carbonates of Lime, Soda, and Potassa; Soaps.
	ALTERATIVES	Agents which bring about a healthy state of the system without sensibly augmenting the secretions	Aloes, Sulphur, Chloride of Mercury, Sesqui-sulphuret of Antimony.
Medicines which act on the Brain and Nerves, and through them on the System generally.	CARDIACS	Agents which invigorate by stimulating the stomach.	Ginger, Pimenta, Capsicum, Caraway Seeds.
	DEMULCENTS	Agents which lubricate and sheath surfaces	Gum Arabic, Linseed, Starch, Flour.
	ANTIDOTES	Agents which counteract the effects of poisons.	Depending on the substance administered.
	EXCITANTS	Agents which excite the brain and nerves, and through them the vascular system.	Alcohol, Ammonia.
	NARCOTICS	Agents which act as above, but whose action is followed by a depression of the vital powers.	Opium, Digitalis, Deadly Nightshade, Camphor.
Medicines which act through the medium of or upon Glands, and glandular Structures.	ANTISPASMODICS	Agents which overcome inordinate muscular action.	Oil of Turpentine, Opium, Alcohol, Spirit of Nitric Ether.
	GENERAL STIMULANTS	Agents which increase the action of glands generally.	Chloride of Mercury, Iodine, Iodide of Potassium.
	DIURETICS	Agents which increase the urinary discharge.	Turpentine, Resin, Nitrate of Potassa, Soap.
	PARTURIENTS	Agents which excite the uterus	Ergot of Rye.
	LITHONTRIPTICS	Agents which dissolve calculi	Hydrochloric Acid.
Medicines which act upon Muscular Fibre.	DIAPHORETICS	Agents which excite the exhalents of the skin	Spirit of Nitric Ether, Solution of Acetate of Ammonia, Potassio-tartrate of Antimony?
	TONICS	Agents which restore the tonicity of the muscular fibre	Sulphates of Copper, Iron, and Zinc; Iodide of Iron, Salt, Gentian Root, Chamomile Flowers.
	ASTRINGENTS	Agents which contract muscular fibre.	Alum, Catechu.

Externally applied.

Medicines which act upon the Skin and external parts by direct application.	REFRIGERANTS	Agents which diminish the morbid heat of a part	Solution of the Diacetate of Lead, Solution of Salt, Cold Water.
	DISCUTIENTS	Agents which repel indolent tumours	Hydrochlorate of Ammonia, Camphor, Soap Liniment, Iodine.
	RUBEFACIENTS	Agents which cause redness of the skin without blistering	Vinegar, Liniments of Ammonia, of Turpentine, and of Tar;
	VESICANTS	Agents which produce blisters	Tar, Pitch.
	CAUSTICS	Agents which decompose the part to which they are applied.	Cantharides, Potassio-tartrate of Antimony, Hot Water. Sulphuric, Nitric, and Hydrochloric Acids; Bichloride of Mercury, Chlorides of Antimony and Zinc, Nitrate of Silver, the Hot Iron.
	DIGESTIVES	Agents which induce suppuration in wounds.	Liniment and Ointment of Turpentine.
	DETERGENTS	Agents which cleanse wounds, and excite in them healthy action.	Acetate of Copper, Ointment of Nitrate of Quicksilver, Chlorinated Lime, Black Hellebore.
	ASTRINGENTS	Agents which diminish discharges from wounds.	Alum, Carbonate and Oxide of Zinc, Armenian Bole.
	ANTISEPTICS	Agents which destroy putrescence in wounds.	Chlorinated Lime and Soda, Nitrate of Potassa, Yeast, Charcoal.
	TRAUMATICS	Agents which excite the healing process in wounds	Myrrh, Aloes, Solutions of the Sulphates of Copper and Zinc, Resin, Oil of Tar.
	EMOLLIENTS	Agents which soften and relax parts	Lard, Olive Oil, Palm Oil, Poultices, Fomentations.

*William Luttony
Breach*
1840

A
MANUAL OF PHARMACY,
FOR
THE STUDENT
OF
VETERINARY MEDICINE;

CONTAINING
THE SUBSTANCES EMPLOYED AT THE ROYAL
VETERINARY COLLEGE,

WITH AN ATTEMPT AT THEIR CLASSIFICATION,

AND THE
Pharmacopœia of that Institution.

BY
W. J. T. MORTON.

“ Affert maxime lumen memoriæ ordo.”—CICERO.

LONDON:
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TO
EDWARD COLEMAN, ESQ., F.R.S.

PROFESSOR OF THE ROYAL VETERINARY COLLEGE,
PRINCIPAL VETERINARY SURGEON TO THE BRITISH
CAVALRY, &c. &c.

SIR,

I FEEL highly honoured in being permitted to dedicate this my first literary attempt to you, and I would that it could be said it is worthy of your patronage.

The science of Veterinary Medicine, released from the trammels by which it was so long confined, has advanced, and is advancing, under your fostering care. You saw its first disenthralment. Like a delicate plant it came forth. The soil around was arid, and chilling blasts threatened its destruction : you shielded it with the mantle of science, and removed every noisome weed from around it. You carefully watched over and nurtured it : it has grown, and become strong. Rich fruit has already been yielded by it, and more is promised. All it now asks is, support from those it shelters, in order that it may maintain the position in which a discerning and an enlightened age has placed it.

Respectfully would I here acknowledge how much to you I am indebted for valuable information derived during a long personal intercourse ; a favour which, I trust, I can and do appreciate.

I am, Sir,

Your much obliged Servant,

W. J. T. MORTON.

ROYAL VETERINARY COLLEGE,
August 1, 1837.



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PREFACE.

WHATEVER tends to lessen labour is assuredly advantageous. With this principle in view, the following pages have been arranged.

It has long been a subject of just complaint, that the student of Veterinary Medicine is compelled to acquire his knowledge of *Materia Medica* from foreign, and not always to him correct, sources.

It is too much to anticipate that this feeble attempt will supply all that is required: it may not, however, be altogether in vain; and perhaps it may excite the energies of those who are not more willing than myself to undertake the task, but far more able to accomplish it.

The slightest inspection will suffice to shew, that my intention has been to aid the Veterinary Student. For him the compilation—for it pre-

tends to very little more—has been made. To give that which is useful, rather than that which is novel, has been my desire; and my object will be fully obtained if I am successful, in any degree, in assisting him in the acquirement of correct principles.

In the pharmaceutical formulæ, I have studied simplicity. It will be seen that I have avoided all deceptives; and yet circumstances may render their addition necessary.

In the chemical compounds, I have followed the last edition of the Pharmacopœia of the College of Physicians, employing the names introduced by them, but not entirely discarding the old ones.

The diagrams explanatory of the decompositions which take place are on the plan proposed by Professor Reid, which I consider more explicit than others.

The views which I have taken of the action of some agents may not accord with those which others take. From difference in opinion merely,

no disadvantage can arise ; and by it truth is more likely to be arrived at, provided this be the object in view, and the searchers after it be actuated by a right spirit.

Wherever I have been made acquainted with peculiar views entertained, I have endeavoured to acknowledge the same by giving publicity to the names of those persons from whom I received the information. Thus I am their debtor.

A word or two as it respects the classification. I know it is not without its faults ; but these are more than counterbalanced by the benefit which the student has hitherto derived from it, and therefore I have ventured to prefix it. Such agents as are used only for Cattle, are printed in italics.

And, now, a promise long since made to my pupils is performed. In making it, I may have done wrong ; but in not attempting its fulfilment I should have done worse.

INTRODUCTION.

MEDICINES are compounded by Troy Weight (from Troyes, a city in France), or, as it is sometimes designated, Apothecaries' Weight, which is thus divided :—

	Pound.	Ounces.	Drachms.	Scruples.	Grains.
℔	1	12	96	288	5760
℥		1	8	24	480
ʒ			1	3	60
ʒ				1	20
gr.					1

Drugs are bought and sold by Avoirdupois Weight (to have overweight), which is divided as follows :—

Pound.	Ounces.	Drachms.	Grains.
1	16	256	7000
	1	16	437.5
		1	27.975

I fear this difference is but little attended to, and that the pound and ounce, whether of Troy or Avoirdupois, are used interchangeably. A reference to the tables must at once shew the errors which are thus

likely to take place. The pound of the latter contains 7000 grains, that of the former but 5760; whilst the ounce of the former has 480 grains, and that of the latter but 437.5.

The Measure now used is designated the Imperial, which, for medicinal purposes, is thus divided:—

	Gallon.	Pints.	Fluid Oz.	Fluid Drs.	Minims.
Cong. or C....	1	8	160	1280	76,800
O.....		1	20	160	9,600
f℥			1	8	480
fʒ				1	60
℥.....					1

Placed opposite to the divisions are symbols, or characters, which in writing are much used; they also indicate whether the substance is to be weighed or measured. These the student would do well to practise the forming of for a few times, until he makes himself familiarly acquainted with them.

Numbers are designated by the Roman numerals; thus, i, ii, iii, iv, v, &c. When a half is required, an abbreviation of the Latin word *semi* or *semis*, a half, is employed: thus, ℥biss, a pound and a half; ℥iiss, an ounce and a half; f℥iiss, fluid drachm and a half, &c.

A few words should perhaps be said respecting the Dispensary; but were I to enter fully into this, I should say more than would be agreeable to many, for too little care is generally manifested in this department. Negligence necessarily leads to the accumu-

lation of filth, and this to waste. Over the door, or in some conspicuous place, these mottoes may be written :

ORDER IS GAIN.

“ LET THERE BE A PLACE FOR EVERY THING, AND
LET EVERY THING HAVE ITS PLACE.”

The dispensary, or pharmacy, should be furnished with fit apparatus for compounding medicines, since all the compounds used should be made by the practitioner, and every drug employed by him powdered under his superintendence : these will be the only means to ensure the proper action of medicines. A large iron mortar and a hand mill, with compound sieves and horn-scoops, &c., are required for powdering and sifting. For this purpose an out-house is preferable, as the dust created is often considerable, and the particles which float about are frequently annoying. In addition, mortars of Wedgwood's ware, of different sizes, ribbed funnels of the same material, spatulas of steel and bone, pewter and graduated glass measures, are requisite for dispensing ; with scales and weights, both large and small.

If possible, uniformity of temperature should be preserved ; and although no display is called for, yet neatness might be ensured, and the place rendered both agreeable and profitable to the student, by attention to little things which much enhance comfort. A small library, containing a few select books, and a

table, with chemical apparatus (not, however, of a costly kind), may be introduced ; while the fire-place will suffice both for making his compounds, and performing his experiments when the labour of the day is over ; and thus will he be almost unconsciously laying the foundation for future acquirements. I write thus, because I know how sadly the inculcation of first principles is neglected, and of how much importance it is that, in early life, they should be implanted ; for by means of these alone the superstructure can be raised either pleasurably or permanently.

As to the manner in which medicines should be kept:—Masses may be preserved in jars, whose inner surface is covered with a film of oil ; or if divided into balls, as is necessary in large establishments, these should be enveloped in strong tissue paper, their form being that of an elongated ovoid, their size not exceeding an ounce and a half. Solutions, whether spirituous or aqueous, may be retained on their dregs, and filtered as required for use.

The formation of such compounds as require the application of heat is best effected in a water-bath. This may be readily formed by suspending any covered vessel within another in which water is placed : the one employed at the College is made of tin, and consists of two vessels of an oval form, placed in a larger oval ; and it is found to answer well.

Gum is a proximate vegetable principle, the result of the first and simplest change the sap undergoes. Many varieties exist, but the kind under notice is yielded by the *Acacia Vera*, which is a native of the sandy parts of Arabia Petræa, and Egypt. It exudes from fissures in the bark of the trunk and branches in a liquid state, but soon hardens on exposure to the sun and air. It has been conjectured to be the result of disease, since weakly trees in wet seasons yield the greatest quantity.

Many kinds are met with in the shops, and different qualities are found mixed together in the same package, termed gum in sorts. The best comes from Morocco in chests and casks.

6 carbon ... $6 \times 6 = 36$

6 hydrogen $1 \times 6 = 6$

90

Qualities and Uses.—Good gum occurs in irregu-

larly-shaped pieces, which are colourless or nearly so, semi-transparent, insipid, and inodorous. It is soluble in water in every proportion, but insoluble in oil and alcohol. Its action is that of a demulcent, sheathing the surfaces over which it passes, and defending them from the action of acrid substances. As such it is employed in the form of mucilage, made by dissolving one part of gum in four or six parts of water. This is frequently had recourse to as a vehicle for the suspension of insoluble matters, such as chalk, hellebore, &c.; and occasionally for rendering oils miscible with water, forming emulsions. Some practitioners use it to give consistence to masses, but such are apt to become hard: a better material is honey or treacle, lard, or soft soap, when admissible.

ACIDUM ACETICUM, *Acetic Acid*.

Old names: Strong Acetic Acid, Pyroligneous Acid.

After the vinous fermentation has been excited in a saccharine solution, and this is exposed to the influence of the atmosphere and a higher temperature, another kind of action is set up, which terminates in the formation of a sour compound denominated vinegar (a fluid too well known to need description), the cause of the acerbity of which is acetic acid. This appears to be formed by the decomposition of the alcohol and an absorption of oxygen from the air. The following diagram will perhaps assist.

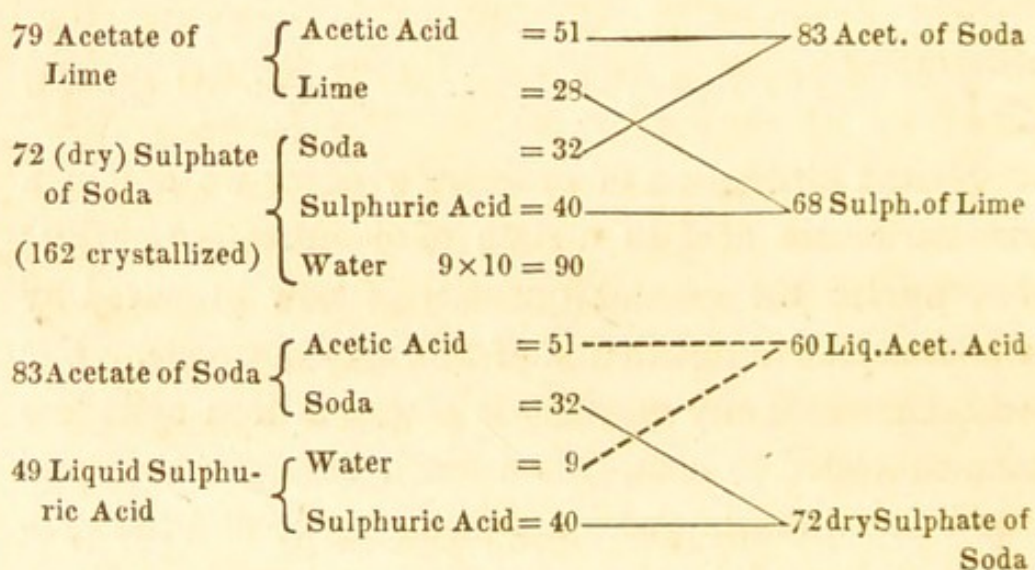
Change in Acetous Fermentation.

<i>Materials.</i>		<i>Products.</i>		
2 equivalents Alcohol = 46	Carbon 4 eq. $6 \times 4 = 24$	1 eq. Acetic Acid = 51		
	Oxygen 2 ... $8 \times 2 = 16$			
	Hydrogen 6			
4 equivalents Oxygen = 32	$\left. \begin{array}{l} \text{Hydrogen 6} \\ \text{Oxygen 2} \end{array} \right\} \begin{array}{l} 3 \\ 3 \end{array}$			
	Oxygen = 8			
	Oxygen 3 eq. $8 \times 3 = 24$	3 eq. Water $9 \times 3 = 27$		

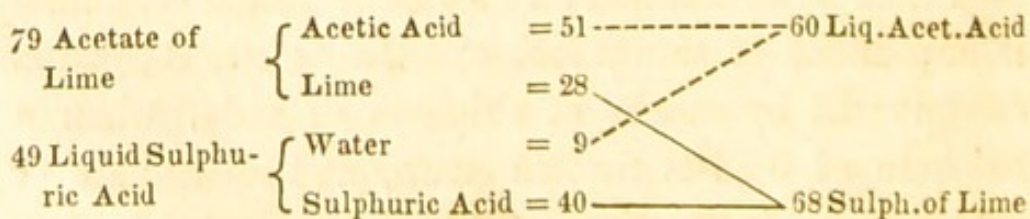
By the distillation of ordinary vinegar we obtain a diluted acetic acid in a state of comparative purity ; but by far the greater quantity is now procured by the destructive distillation of the harder woods. For which purpose any quantity is placed in iron cylinders and subjected to heat, when much watery vapour and some inflammable gases are disengaged, and the products collected in the receiver consist of a dilute acetic acid, tar, empyreumatic oil, and pyroxilic spirit. Charcoal remains in the retort. The impure acid being allowed to stand undisturbed for some weeks, it deposits the tar, yet retains much of its colouring matter and peculiar odour ; these are partly separated by re-distillation. To the distilled acid, lime is now added to saturation, and the acetate formed is decomposed by means of sulphate of soda, when a sulphate of lime is thrown down, and an acetate of soda remains in solution. This is evaporated to dryness, and fused at a high temperature, so as to sepa-

rate the impurities, and at the same time not to decompose the salt; this is afterwards effected by means of sulphuric acid in a retort, when acetic acid passes over, and a sulphate of soda remains behind.

The following diagrams may more satisfactorily explain the processes:—



Sometimes the acetate of lime is decomposed by the direct application of sulphuric acid, when the change effected is obvious, being as follows. The College of Physicians, however, directs it to be prepared from the acetate of soda.



Composition.—3 equivalents, oxygen... $8 \times 3 = 24$

3 hydrogen $1 \times 3 = 3$

4 carbon ... $6 \times 4 = 24$

Weight of equivalent.....51

Qualities and Uses.—Acetic acid is a pellucid colourless fluid, agreeably sour, and possessing the penetrating odour of vinegar. Its strength is ascertained by its saturating power. For instance, dry acetic acid saturates almost exactly its own weight of pure carbonate of lime, or 50 parts will saturate 117 of crystallized carbonate of soda. When prepared as above, it is designated *glacial acetic acid*, from its becoming solid and crystalline at a low temperature; it consists of

1 equivalent, acetic acid = 51

1 water..... = 9

60

Of the specific gravity of 1.048, as usually obtained, it contains 30.7 per cent. of real acid, and 100 grains will saturate 87 of crystallized carbonate of soda.

It is about six times the strength of ordinary vinegar, and, if it is in this proportion diluted with distilled water, it will supersede that compound for all medicinal purposes. It is a rubefacient and antiseptic, correcting the fœtor of phagedenic ulcers. It assists in the exfoliation of carious bone; and as an external

applicant, it is employed as the solvent of the active principle of the blistering fly. Combined with hydrochlorate of ammonia, it is used as a discutient for indolent tumours; and diluted with boiling water, it is occasionally employed with success in giving tone to the relaxed fibre, in cases of sprain, &c. As strong acetic acid readily dissolves camphor and the essential oils, an efficacious rubefacient may be made by their union.

The impure pyroligneous acid, as it passes over contaminated with tar, has been found serviceable in cases of mange; but the tarry matter which remains after the distillation of the impure acid is more commonly used under the name of oil or spirits of tar, this being mixed with an equal quantity of any common oil. Or a better compound is formed thus, constituting the usual mange liniment of the Royal Veterinary College:—

LINIMENTUM TEREBINTHINÆ COMPOSITUM,
Compound Liniment of Turpentine.

Take of Oil of Turpentine

Pyroligneous Oil of Tar

Whale, Seal, or Rape Oil, of each equal parts.

Mix together, so as to form a liniment.

The oil of tar has been likewise extensively employed as an excitant to wounds, which it powerfully stimulates; and, consequently, when the healing process is tardy in them, it will be found a useful appli-

cant. Its offensive smell, however, may preclude its general use. It is valuable, at least as an adjuvant, in mange in all our domestic animals; and it is of admirable use in preventing the attack of the fly, or healing the wounds inflicted by the fly on sheep. Perhaps its activity, both when applied to the skin and as a traumatic, may be referrible to the presence of creosote.

Pyroxilic spirit, which is obtained by exposing the impure pyroligneous oil of tar, as above formed, to repeated distillations until a pure spirit passes over, is an active solvent of the gum resins; and I have found it to be a cheap and valuable substitute for rectified spirit in the formation of the tincture of aloes and myrrh. In the shops it is known by the name of rectified naphtha.

ACIDUM ARSENIOSUM, *Arsenious Acid*. Vulgo : Arsenic.

The metal arsenicum is capable of combining with different proportionals of oxygen, amongst which the one under notice is the most common. It has received various names, such as the oxide of arsenic, white arsenic,—and for brevity, arsenic. It is brought from Saxony and Bohemia, where it is obtained in large quantities by roasting the ores of cobalt, and also arsenical pyrites; for which purpose a furnace resembling a baker's oven is used, having a long flue or horizontal

chimney, into which the fumes pass, and are condensed in the form of a greyish or blackish powder. This is refined by a second sublimation in close vessels, adding a little potassa to detain the impurities.

<i>Composition.</i> —1 equivalent, arsenicum.....	= 38
2 equivalents, oxygen, 8×2	= 16
	—
Equivalent.....	54

Qualities and Uses.—Arsenious acid occurs in two forms, one that of a solid semi-vitreous mass, the other in opalescent pieces. It is commonly sold in the shops in the state of powder, when it is frequently mixed with carbonate or sulphate of lime or baryta, a fraud which is easily detected by its not being entirely volatilized by heat, which takes place at 380° F. It has no smell, emits no odour when burnt, and leaves on the palate a sweetish taste. It has a specific gravity of 3.7, is soluble in 400 parts of water at 60° , and in only 13 at 212° . Its solubility is much increased by the addition of a little potassa.

As a therapeutic agent, arsenious acid can be well dispensed with. It is, however, employed by some as a tonic, being given in doses daily of from gr. x to xx; by others as a vermifuge, and by those of the old school it is extolled as a caustic, and a very powerful one doubtlessly it is: but there is this disadvantage, that we cannot control its action, and oftentimes a most extensive sloughing and painful wound is caused by it.

Injudiciously administered, death has been the result ; when the whole of the abdominal viscera are found in a state of inflammation, and the lining surface of the stomach and intestines eroded in patches.

Much has been said about antidotes ; but, even to the present time, none can be relied on. The French thought that they had discovered one in the hydrated peroxide of iron ; but on a repetition of the experiments at the School of Lyons, this drug seems to be unworthy of confidence. As lime-water throws down an insoluble arsenite, this may be given in large quantities, or a mixture of chalk and water, followed by active oleaginous purgatives (croton and linseed oils) and demulcents ; but it is to be feared that, as the dose is large which is capable of producing very urgent symptoms in the horse, little good will be obtained.

I am acquainted with a case which occurred in the practice of Mr. C. Spooner, in which this treatment was successful ; and others are recorded.

In order to ascertain whether arsenic is the cause of death, tests or re-agents must be had recourse to. Here the same delicacy in manipulation is not called for as when a fellow-creature has unfortunately resorted to this agent as a means of terminating his existence. The reason of this is, that a comparatively large quantity is requisite to produce death in the horse.

Should some of the powder be found among the contents of the stomach, it may be removed, and dried

on blotting-paper. A portion should then be taken on the point of a knife, and held in the flame of a spirit-lamp. If it evaporates, suspicion of the presence of arsenic will be excited in the mind. Another portion then should be mixed with twice its weight of fresh burnt charcoal, finely powdered, and carefully placed in a test tube. This being steadily held within the flame of the lamp for a few minutes, will, if arsenious acid is present, yield a grey metallic crust—the metal arsenicum—the oxygen of the acid going to the carbon, and forming carbonic acid, which is dissipated in a gaseous state. If a particle of this metallic crust is removed, and heat applied, an alliaceous odour will be perceived, which is one of the characteristics of this metal. This process is called testing by reduction.

It is possible, however, that the agent has undergone solution, or become so commixed with the food as to elude detection in this way: other means must then be employed. Let the contents of the stomach and its eroded portions be boiled for twenty minutes in distilled water, in a clean vessel, and the solution be afterwards filtered, and a portion of it placed in three test tubes. To the first add a few drops of the ammoniaco-nitrate of silver; to the second a little ammoniaco-sulphate of copper; and to the third, water impregnated with sulphuretted hydrogen. If arsenious acid is present, in the first, a lemon-yellow precipitate will be formed—arsenite of silver; in the second, an

apple-green—the arsenite of copper; and in the third, a bright yellow, the sulphuret of arsenicum. If necessary, these precipitates may be reduced.

A very ingenious method of detecting very minute portions of arsenious acid in large quantities of any solution, even a grain in four pints of water, has been discovered lately by Mr. Marsh, of Woolwich; and as the method is as simple as ingenious, I will endeavour to describe it.

Its principle consists in bringing the suspected fluid into contact with nascent hydrogen, when, if arsenic is present, arseniuretted hydrogen will be formed, which by combustion will yield water, and the metal arsenicum. In order to effect this, obtain a vessel, or a glass tube, having a stop-cock with a jet affixed to it. Introduce into this the solution of the contents of the stomach with a little sulphuric acid, and then a rod of pure zinc. Hydrogen will be soon evolved, which will take the arsenic into combination with it, forming arseniuretted hydrogen gas, which, escaping at the jet, is there to be set on fire. A piece of glass being held over the flame, water will be deposited, which is soon evaporated by the heat, and a brilliant metallic disc consisting of arsenicum will remain. This may be afterwards subjected to further experiment, when its real nature will be identified.

A proof of the delicacy of this test is, that one grain of arsenious acid dissolved in four imperial pints

of water, has yielded one hundred metallic discs; at the same time, it is the most elegant mode which has been introduced. An apparatus which will answer well for the veterinarian is one of those vessels used for obtaining instantaneous light by the aid of a stream of hydrogen gas thrown on spongy platinum, the jet being vertical instead of horizontal.

ACIDUM HYDROCHLORICUM, *Hydrochloric Acid*.

Old Names: Spirit of Salt, Muriatic Acid.

This acid is disengaged by the action of sulphuric acid on common salt; hence the old name for this compound was spirit of salt; afterwards it was called muriatic acid; its more correct cognomen will presently be seen to be hydrochloric acid. To obtain it,

Take of Dried Common Salt, 2 pounds

Liquid Sulphuric Acid, by weight 20 ounces.

Water, 24 fluid ounces.

The sulphuric acid is to be diluted with one-half of the water in a glass retort, and to it, when cold, the salt is to be added: the remainder of the water being placed in the receiver, the retort is to be attached, and heat applied by means of a sand-bath, when the hydrochloric acid will distil over.

Decomposition.—Dry common salt is a chloride of sodium: dissolved in water, it becomes an hydrochlorate of soda; the oxygen of the water going to

oxidize the sodium, and the hydrogen combining with the chlorine to form hydrochloric acid: when to this compound sulphuric acid is added, from the superior affinity it has for soda to that which hydrochloric acid has, it unites with it, forming a sulphate of soda, and hydrochloric acid is set free. The following diagram will further explain:—

<i>Materials.</i>			<i>Products.</i>	
60 Chloride of Sodium	Chlorine	= 36	Hydroch. Acid Gas = 37	
	Sodium	= 24		
49 Sulph. Acid (40 dry Acid, 9 Water)	Hydrogen	= 1	Sulphate of Soda = 72	
	Oxygen	= 8		
	Sulphuric Acid	= 40		

The composition of hydrochloric acid gas is now seen to be,

1 equivalent, chlorine = 36

1 hydrogen = 1

Equivalent.....37

It has a great affinity for water, which can absorb 480 times its bulk of this gas, considerable heat being produced by the combination, and the resulting liquid acid having a specific gravity of 1.21.

Qualities and Uses.—When perfectly pure, hydrochloric acid is transparent and colourless; but as prepared on a large scale it has a yellowish colour, arising from the presence either of a little free chlorine or some oxide of iron. It has all the characters of an

acid, but is the weakest of the three mineral ones. It emits copious fumes on exposure to the air, which are rendered more obvious by the presence of ammonia; and it erodes animal and vegetable substances. Its specific gravity varies with the quantity of real acid it contains,—that of the shops is seldom more than 1.16, which contains 32.32 per cent.

Hydrochloric acid is a tonic and antiseptic, a caustic, and a lithontriptic. As the first, it is seldom given; as the second, it may be used externally in the form of lotion, being largely diluted with water. Its properties in this respect, in all probability, depend upon the presence of chlorine. In an undiluted state it will decompose animal matter, blanching it, and destroying any fœtor that may exist. It may, therefore, be employed to touch the surfaces of ulcers that have taken on unhealthy action. The muriate or butyr of antimony of the old school owes its value to this acid. As a lithontriptic, or dissolvent of calcareous concretions in the bladder, I am acquainted with two cases in which its employment was attended with benefit. One occurred in the practice of Mr. Draper, of Stanton-by-Bridge; the other in that of Mr. Beeson, of Amersham. It may be given in doses of from ʒiiss to ʒiij twice a-day in a pint of water. In the case of Mr. Beeson's, it had the effect of softening the calculus, so that, on performing the operation of lithotomy, it came away in fragments. In that of Mr.

Draper's, I do not think the calculus had formed itself; but the sabulous matter voided was immense, and the irritation caused by it had brought the animal almost to the last stage of emaciation: he, however, got well by the steady administration of this acid in two-drachm doses in a pint of water daily. If we bear in mind, that the mineral acids do not undergo assimilation, and the calcareous deposits in the bladder of the horse consist principally of the earthy carbonates, it is not unlikely that such should have been the result.

ACIDUM NITRICUM, *Nitric Acid*. Old Names :
Aqua fortis, Single and Double Nitrous Acid.

This acid is obtained by the action of sulphuric acid on the nitrate of potassa.

Take of dried Nitrate of Potassa

Liquid Sulphuric Acid, of each, by weight,
two pounds.

Mix them together in a glass retort, and distil the nitric acid, by means of a sand-bath, into a receiver which is kept cool.

Decomposition.—The change which here takes place is easily comprehended. Sulphuric acid possesses a greater affinity for the base, potassa, than nitric acid does; consequently when added to the nitrate of potassa, and aided by a high temperature,

it effects its decomposition. The sulphuric acid combines with the potassa, and forms a sulphate of potassa, which remains behind in the retort, whilst the water unites with the nitric acid set free, and these pass over into the receiver in a state of liquid nitric acid.

A diagram may further illustrate this ; it being recollected, that two atoms of sulphuric acid are employed to decompose one atom of nitrate of potassa : for the purpose of explanation, however, the proportions are as four and two.

2 eq. Nitrate of Potassa	{	2equiv. Nitric Acid	$54 \times 2 = 108$	-----	135 liq. Nitric Acid
		2 ... Potassa	$48 \times 2 = 96$		
4 eq. Sulph. Acid of Commerce	{	3 ... Water	$9 \times 3 = 27$	-----	274 Bisulphate of Potassa
		2 ... Water	$9 \times 2 = 18$		
		4 ... dry Sulph. Acid	$40 \times 4 = 160$		

The above gives an acid thus composed :

2 equivalents nitric acid	$54 \times 2 = 108$
3 water	$9 \times 3 = 27$
	135

Or, if the half be taken,

1 equivalent of nitric acid	$= 54$
$1\frac{1}{2}$ water	$= 13.5$
	67.5

This has a specific gravity of 1.5033 to 1.504.

It rarely, however, occurs of this strength in the

shops ; the proportionals of water are commonly doubled. Occasionally, also, a little sulphuric and hydrochloric acids are present, which may be detected by means of the nitrates of barytes and silver ; but these seldom affect the medicinal properties of the compound.

Composition of dry nitric acid :

5 equivalents oxygen = 40

1 equivalent nitrogen = 14

—
Equivalent.....54

But these elements are capable of existing only in combination with some base.

Qualities and Uses.—Liquid nitric acid is a limpid fluid, of a palish straw-colour, possessing strong corrosive qualities, emitting suffocating fumes, and attracting moisture from the air. It tinges the cuticle indelibly yellow, which tint is heightened by the application of an alkali, and thus is afforded a ready test for the presence of this acid. Its specific gravity is given as directed to be prepared by the College of Physicians ; but, of course, this will vary with the quantity of real acid the water contains.

Aqua fortis is merely a diluted nitric acid, prepared by the distillation of nitre and diluted sulphuric acid. According to Dr. Ure, it contains only one-fourth as much acid as the strong nitric acid, and double-aqua-fortis one-half.

Nitric acid is a valuable and active caustic and anti-

septic. It quickly destroys animal substances, and therefore may be advantageously made use of where fungous excrescences or luxurious growths require reduction; for which purpose a pledget of tow placed on the end of a stick may be dipped into the acid, and then firmly pressed on the surface; or should this be extensive, a layer of tow saturated with the acid may be laid on the part (as in severe cases of canker). On removal, it will be found that the whole surface with which the acid has come in contact is deadened. Sloughing will afterwards ensue, and healthy granulations will subsequently arise. Its fluidity is the only objection to its general employment; but with me I confess it is a favourite escharotic. The nitrate of silver owes its valuable properties to this acid.

As an antiseptic, a very dilute solution, in the proportion of two or more drachms to a pint of water, may be employed for indolent or sphacelated wounds and ulcers, which will serve to correct the fœtor, and excite the contiguous parts to healthy action. As such, however, it must yield to the compounds of chlorine. I am not aware that it is administered internally. Its action, however, would be that of a tonic and an astringent.

It is employed as a pharmaceutical agent in the formation of nitrate of silver, the ointment of the nitrate of mercury, and the spirit of nitric ether.

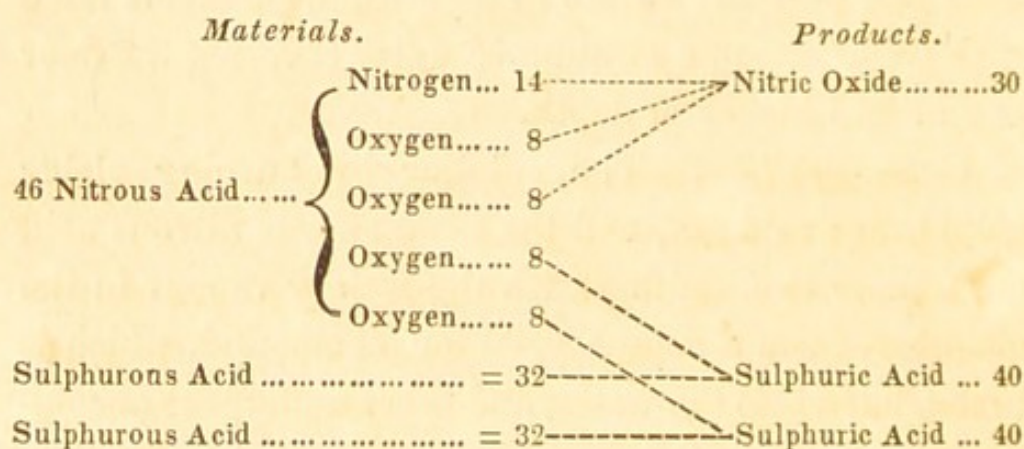
ACIDUM SULPHURICUM, *Sulphuric Acid*.

Old Names: Oil of Vitriol, Vitriolic Acid.

Occasionally this acid is found in the neighbourhood of volcanoes, either in a concrete state or in solution; but as an article of commerce, it is procured in this country by the combustion of eight parts sulphur and one part nitrate of potassa, in chambers lined with lead, having a stratum of water covering the floor one or two inches in depth.

Decomposition.—The sulphur by burning yields sulphurous acid gas, and the nitre affords nitrous acid gas; these two, uniting with the watery vapour in the chamber, form a solid crystalline compound, which is precipitated into the water, and there undergoes decomposition. The nitrous acid imparts to two proportionals of sulphurous acid two atoms of its oxygen, converting them into sulphuric acid, which is retained by the water, and is itself resolved into nitric oxide gas, which, rising into the chamber, becomes again nitrous acid gas at the expense of the oxygen of the air, descends and commingles with more sulphurous acid gas and watery vapour, and forms again a solid compound, which undergoes the same changes as the first. These combinations and decompositions continue until all the combustible materials are consumed, and the water is charged with sulphuric acid. It is

then concentrated by boiling, first in leaden boilers, and subsequently in glass retorts, until it acquires the necessary specific gravity. It is afterwards put into large globular glass vessels, enveloped with wickerwork, called carboys. The following diagram will further illustrate the changes which take place in its formation :—



Another method of obtaining this acid is by forming the sulphurous and nitric acid gases in separate chambers, and allowing them to enter a third, containing watery vapour. On the Continent considerable quantities are made by exposing the sulphate of iron to heat in close vessels, when the acid distils over, and is collected in a receiver. The old name of vitriolic acid was derived from this circumstance, sulphate of iron being then designated vitriolated iron, or green vitriol. The term oil of vitriol was given to it from its apparent viscosity.

Composition.—3 equivalents oxygen $8 \times 3 = 24$
 1 equivalent sulphur..... = 16

 Equivalent..... 40

This is designated dry or anhydrous sulphuric acid.
 The liquid acid is composed of

1 equivalent dry acid = 40
 1 water... = 9

 Equivalent.....49

As an article of commerce, the water is in the proportion of five to four of the dry acid.

Properties and Uses.—Sulphuric acid is a dense, colourless, transparent fluid, inodorous, emitting no fumes, having an extremely sour taste, and a specific gravity of 1.845 when pure. This seldom is the case, the acid of commerce being frequently impure from the presence of sulphates of potassa and lead. A small quantity of these is the result of the formation of the acid; but they are often added to increase its specific gravity. According to Dr. Ure, if 500 parts of the acid contain on evaporation more than five grains of saline matters, it is sophisticated. It possesses so great an affinity for water, that, if exposed to the air for a month, it is said to double its weight. If suddenly mixed with this fluid, it gives out much heat. It likewise chars animal and vegetable substances, which communicate to it a brown tint. These circum-

stances point out the necessity of keeping this acid in bottles having closely-ground glass stoppers. It becomes solid at 15° F., and boils at 650°. These points vary with the specific gravity of the fluid: that of congelation is much higher, and even above that of water, if the acid be diluted with 12 or 13 per cent. of water. Of this I witnessed a proof some years since, when carboy after carboy, during a severe winter, was burst by the expansion of the acid when assuming the crystalline form.

It acts on the skin as a caustic, feeling unctuous to the touch, arising from the cuticle undergoing solution; soon after which a burning pain is experienced, from the nervous fibrillæ being laid bare. It has been said that the caustic effects of the concentrated mineral acids are referrible to the affinity which they possess for the elements of water: they unite with the hydrogen and oxygen, precipitate the carbon, and disengage the nitrogen.

An ointment composed of one part of this acid and twelve of lard has been advocated in mange. Sometimes sulphuric acid is introduced into blistering compounds, for the purpose of increasing their potency,—a practice which deserves the utmost reprobation.

Internally administered, it is a tonic and an astringent, and may be given in doses of from ʒj to ʒij, largely diluted with water or some bitter vegetable infusion; but as a therapeutic agent, it is best when

combined with certain bases, such as the oxides of iron, of copper, and of zinc, forming sulphates.

Wagoners frequently give it to horses, sprinkled over their provender; and sometimes the quantity administered by them is so great as to be productive of fatal consequences. I knew a team of four horses thus destroyed. The antidotes would be magnesia, or the alkaline carbonates, or soap, exhibited in large quantities of water. The indications of its having been employed are the symptoms which accompany gastro-enteritis; and, in addition, the tongue, the inside of the mouth, &c. will appear wrinkled, and of a brownish colour, and the teeth blackened.

Sulphuric acid is largely employed as a pharmaceutical agent; its affinity for the various salifiable bases is great, and the resulting compounds are designated sulphates. A knowledge of this is available for the obtaining of certain compounds, as seen in the formation of nitric and hydrochloric acids.

On the fixed oils it exerts a saponifying influence: during its action sulphurous acid fumes are disengaged, glycerine is formed, and sulpho-margaric, sulpho-stearic, and sulpho-oleic acids. A compound of this kind constitutes the black oil of the farriers, a form for which has been given by Mr. Percivall in his "Hippopathology." It is used as a digestive.

Take of Olive OilOj

Oil of Turpentine ...℥ij

Mix, and add six drachms of sulphuric acid, leaving the stopper out of the bottle until the heat evolved has passed off.

ADEPS, *Fat.* Vulgo : Hogs' Lard.

This is obtained from the adipose matter about the flank of the hog, for which purpose it is freed from the membranes and vessels with which it is connected, and is cut into small pieces, well washed and then melted, with the addition of a little water, care being taken that the heat be not too intense. In its fluid state it is run into bladders and small casks, where it concretes.

Chemical Composition.—The ultimate elements of lard have not been ascertained ; but they are supposed closely to resemble those of fixed oils generally. Chevreton has made lard to consist of two distinct substances in a state of mechanical mixture, which he has designated stearine and elaine. The one is solid at the ordinary temperature of the atmosphere, the other liquid. They exist in the proportions of

38 parts stearine
62 parts elaine
100

Properties and Uses.—Lard is an emollient, and constitutes the basis of most ointments. It should be tasteless, inodorous, soft, and colourless. It melts at

97°; is decomposed by long exposure to the air, whence it abstracts oxygen, becomes yellow, and forms a peculiar acid called the sebacic, which may be removed by repeated washings in water. The strong acids likewise decompose it. It is insoluble in water and alcohol, but may be made to unite by the intervention of an alkali, with which it forms saponaceous compounds.

ALOES EXTRACTUM, *Extract of Aloes.* Aloes.

The inspissated juice of the leaves of the aloe plant. Many kinds of this extract are met with in commerce, but it is probable they depend more upon the mode of procurement and culture than upon varieties of the plant.

The genus aloe includes a numerous family of plants of a half-shrubby character, having thick and succulent leaves, beset with teeth on their edges, and long fibrous roots, which serve rather as means of retention than organs of nutrition. They are all inhabitants of tropical climates. The southern parts of Africa abound with them, whence, more than 200 years since, they were introduced into our West India islands, where they may be said to be now naturalized.

The extracts used in veterinary practice are obtained from two distinct species of the plant.

1. Aloe Spicata, *Spiked Aloe*; Officinal, Aloes Spicatae Extractum, *Extract of the Spiked Aloe.*

The spiked aloe yields the extract known by the

name of the Cape ; it also afforded the Socotrine, which is no longer to be met with in the market. The plant rises with a thick round stem, three or four feet in height, from which fleshy and tapering leaves proceed, abounding with a clammy juice, since they respire but little, yet absorb much moisture. From these the extract is procured by cutting them off close to their insertion, and then disposing them in tubs in such a manner that the juice may flow out. Expression is occasionally had recourse to. The grosser feculent matter is allowed to subside, after which inspissation is carried on by the aid of heat, until the whole acquires a fit consistence, when it is poured into chests principally, for exportation.

2. Aloe Vulgaris, *Common Aloe* ; Officinal, Aloes Vulgaris Extractum, *Extract of the Common Aloe*.

This appears to be the true aloe of the ancients. From it is derived the Barbadoes extract, by a course of procedure similar to that which is resorted to at the Cape of Good Hope.

The plants are chosen when they are two or three years old, and they will be productive for ten or twelve years, if properly manured. They would seem to be short-stemmed, their large and very succulent leaves springing apparently from the surface of the soil, and being filled to saturation with juice. These are grasped by the labourers, cut off at their bases, and arranged in vessels in such a manner that these

natural reservoirs soon become emptied. The leaves are then used as manure, but the juice taken to the boiling-house for evaporation. This is carried on until it attains the viscidness of honey, when it is run into calabashes, or empty gourd shells, capable of containing from 20 to 60 pounds weight, and in this state it is imported into the market. An inferior quality is sent over in casks. That which in books is described as caballine, or horse aloes, said to be used by farriers, is thought to be the refuse, after the making of the Barbadoes extract.

None other than the Cape and Barbadoes extracts need to be employed by the veterinarian. Preference is given by most private practitioners to the latter; and although it is extremely difficult to divest the mind of an early impression, yet I feel assured that, if care were taken in the selection of the drug, the animal properly prepared, and the dose duly proportioned, the Cape would be found quite as effectual as the more expensive Barbadoes extract.

The external characters of the two should be studied; for although a great deal is said about the sophistication of aloes with resin and ivory black, &c., I believe that the greatest fraud now practised is the substitution of the one for the other, or, what is by far more common, an admixture of the two is sold as the Barbadoes extract: this is known in the shops by the name of melted aloes.

The following contrasted characters may, perhaps, assist the inexperienced. The taste of both is intensely bitter and nauseous.

BARBADOES.

CAPE.

COLOUR.....Brown or liver.....Darker, approaching to black.

FRACTURE...Dull* and granular..Resinous and splintery.

ODOURStronger, and more aromatic than the Cape.

POWDER.....Greenish-yellow.....Yellow.

Chemical Composition and Uses.—In the first there remains much to be understood, and many analyses have been attempted. The extract of the aloe is described by most writers as consisting of vegetable mucus, resin, and extractive matter; these varying in their proportions in the different kinds of extract, and the value of each depending upon the quantity of the last principle, as in this its activity resides. M. Braconnot conceives aloes to be a substance *sui generis*, to which he has given the name of *bitter resin*. Tromsdorff concludes, from his analyses, that the socotrine extract consists of

A saponaceous bitter principle.....	75 parts
Resin	25
	100

* The dulness of the extract appears to depend upon the presence of a little water, since, if it be melted and this dissipated, it assumes a bright, shining aspect.

The Barbadoes of

A saponaceous bitter principle.....	81.25
Resin	6.25
Vegetable Albumen	12.50

 100

As it is the same plant which yields the Socotrine and the Cape extracts, the first analysis may be accepted as affording the constituents of both, allowing for the want of care in preparation, and something, perhaps, for cultivation. The presence of vegetable albumen—after the difference in the quantity of the active principle—is the chief distinctive between the Cape and the Barbadoes extracts; while the nearly perfect solubility of one in boiling water, and the imperfect solubility of the other, is a means, when others fail, of detecting the substitution of the one for the other. This test will also render evident any other sophistication.

A knowledge of the composition of the extracts used in veterinary practice gives us some clue to the comparative dose of each. It has been said that six drachms of the Barbadoes are equal to seven drachms of the Cape; and although analysis would hardly warrant this difference, yet, for practical purposes, it may be allowed.

I have not from experiment found that the one is more certain or quicker in its operation than the other;

but I have ascertained that the action of the bowels is kept up longer by the Barbadoes extract than by the Cape ; also that the mixture of the two, in the proportion of two parts of the latter to one part of the former, or at most equal weights of each, is nearly, if not quite, as effectual in producing purgative action as the former alone.

Aloes is said, from the slowness with which it undergoes solution in the alimentary canal, to exert its influence principally upon the colon and rectum. Whether this is the case in the horse I have very great doubts. In those cases in which horses die of superpurgation produced by aloes, the whole of the mucous lining of the intestines will be found inflamed, but particularly that of the cæcum and colon, the rectum not being involved in so marked a degree.

Some persons consider the action of this drug to be primarily on the liver. With this I do not concur. It is only a part, and a small part, of the duty which it performs. Perhaps the modes in which the extracts are administered by veterinarians influence and modify their action. Those who advocate the combination of alkaline compounds certainly change their general effects. By means of these additions, they are rendered more soluble, it is true ; but at the same time their purgative properties are impaired, and they cease to operate specifically on the large intestines. This last I conceive to be an advantage

gained, as is also the first; whilst the other alteration may, by a little experience, be easily provided against.

I have adopted the suggestion of Mr. B. Clark, and have much pleasure in recording it, of making use of a water-bath for dissolving the extract, and of mixing it with the other materials. The aloetic compounds which are employed here are as follow:—

Cathartic Mass.

Take of Aloes, broken into small pieces, 8 parts

Olive Oil1 part

Treacle.....3 parts

The aloes and oil are to be melted together in the bath, and when removed from the fire, the treacle is to be added, stirring the whole together. The addition of the treacle last may not, to many persons, appear a matter of much moment; but I have found that on it depends the consistence of the compound; for if long boiled (which is at all times objectionable in the formation of aloetic compounds), the treacle will render the mass hard and brittle. If it is made as here directed, it will be found soft and pliable, subject, however, of course, to variations according to the temperature of the place in which it is kept, and on which account, and, indeed, for many other reasons, the pharmacy of every practitioner should be as nearly as possible of a uniform and medium temperature.

This combination affords an easy method of giving a desired quantity, there being half as much materials added as there is aloes in the compound. The dose, as a purgative, varies from ʒvj to ʒxij^* .

Aloes should also be kept in a state of solution: to obtain this the following form may be adopted:—

SOLUTIO ALOËS, *Solution of Aloes.*

Take of Spiked Aloes, in small pieces,	1 part
Distilled Water.....	7 parts
Proof Spirit.....	1 part

Dissolve the aloes in the water by means of the bath, and when removed add the spirit. The compound will be nearly permanent, a small portion of resinous matter only being deposited by keeping, which is of no moment. The dose will vary from fʒiv to fʒviij .

It is likewise desirable to keep the extract in powder, for extemporaneous combination; but it is well known to be acted upon both by heat and moisture, and, sometimes running together, it forms a mass as solid as at first. This may be prevented by mixing with the re-

* The activity of this mass is much increased by the addition of a few drops of croton oil. Indeed, I am of opinion that the combination of purgatives for the horse has been too much lost sight of. Six drachms of Cape aloes and ten drops of croton oil have proved equal in action to eight drachms of Barbadoes aloes.

cently powdered extract one-fourth of its weight of highly dried flour or meal. Of course, it will be easy to allow for this addition when dispensing the medicine.

It may, perhaps, be observed, that in these formulæ all correctives, whether in the shape of essential oils or otherwise, have been abstained from; and that on the ground of their being unnecessary; nevertheless, the veterinary surgeon may find it desirable occasionally to add them: this he will do exercising his own judgment, and that both in this and other compounds.

It has been said that a carminative, by its stimulating influence on the mucous membrane of the intestines, not only prevents griping, but secures and quickens the operation of the purgative. As adjuncts, mashes should be given; and, if possible, the animal should not be allowed to eat anything else for four-and-twenty hours previous to the exhibition of a purgative agent. They will render the bowels more susceptible of the impression of the cathartic, and a less quantity will excite them into increased action.

Mashes of themselves are laxatives, their operation depending upon the siliceous matter contained in the bran of which they are made, mechanically irritating the inner lining of the intestines.

The extract aloes, besides being employed as a cathartic, is administered as a nauseant and alterative.

For the first purpose it is exhibited in doses of a drachm, repeated every six hours, until the bowels respond, and in the like and increased quantities daily, combining it with soap, in order to accomplish the second indication. The formulæ are,—

Alterative Mass, No. 1.

Take of Spiked Aloes, in powder, 4 ounces
Soft Soap 4 ounces
Common Mass 2 pounds

Beat together, so as to form a uniform mass. Dose, 1 ounce.

Alterative Mass, No. 2.

Take of Spiked Aloes, in powder, 8 ounces
Soft Soap 8 ounces
Common Mass..... 16 ounces

Beat together, so as to form a uniform mass. Dose, one ounce.

It will be seen that each ounce of No. 1 contains one drachm of aloes and one of soap, whilst in No. 2 these proportions are doubled.

In this compound, probably the bitter of the aloes tends to restore the tonicity of the system, whilst, at the same time, the bowels and kidneys are gently, although imperceptibly, acted upon.

As a traumatic, aloes has been found serviceable. At times, it is sprinkled over the wound in a state of

powder; but more commonly it is formed into a tincture, in combination with myrrh, the antiseptic properties of which increase the value of the solution.

TINCTURA ALOËS COMPOSITA, *Compound Tincture of Aloes.*

Take of Spiked Aloes, in coarse powder, 1 pound
Myrrh, do. $\frac{1}{2}$ pound
Rectified Spirit* 1 gallon
Water $\frac{1}{2}$ gallon

Digest for fourteen days, frequently shaking the mixture, and filter for use.

ALUMEN, *Alum.*

This salt consists of alumina, potassa, and sulphuric acid. It is occasionally found native in the neighbourhood of volcanoes; but by far the greater quantity is obtained by the decomposition of aluminous schistus or slate, which contains also a large portion of bituminous matter and some sulphuret of iron.

The slate is roasted, so as to dissipate the bitumen, and at the same time the sulphur is partly converted into sulphuric acid, at the expense of the oxygen of the air. The process is perfected by subsequent exposure to air and moisture, when the acid combines with the alumina, and the sulphate of alumina effloresces on

* The pyroxilic spirit, or rectified naphtha, may be advantageously substituted for the rectified spirit.

the surface. This is separated by lixiviation, and when the solution is evaporated down to the specific gravity of 1.35, to it is added potassa, or some of its salts, and the whole is run into coolers, and allowed to crystallize. The alum thus formed undergoes a second solution and re-crystallization in casks, which are made so as to take to pieces, when the salt is found exteriorly in a solid cake, but interiorly its crystals are better defined.

The largest alum works in this country are at Whitby, in Yorkshire, and at Hurlett, near Paisley, in Scotland. On the average, one hundred and fifty tons of the slate afford one ton of alum.

Properties and Uses.—Alum, or the sulphate of alumina and potassa, occurs in octohedronal colourless crystals. It slightly effloresces on exposure to the air, has a rough and acidulous taste, is soluble in sixteen parts of water at 60° , and in about double its weight of boiling water. It has a specific gravity of about 1.71. Exposed to heat, it loses its water of crystallization, and is then termed “burnt, or calcined alum,” which is employed as an erodent. Care should be taken that in preparing it the sulphuric acid is not disengaged, for it will then become nearly inert. This may be known by its not reddening syrup of violets. In the shops there is found a variety of alum, called Roche or Rock alum, in pieces of the size of an almond, and covered with a pink powder. This should

come from Roccha in Syria, but the greater part of it is made by colouring alum with rose-pink. It possesses no properties to recommend it above the alum of commerce.

Alum is a powerful astringent, whether administered internally or applied externally. It may be given in doses of from ʒij to ʒiv , and its use has been attended with some success in obstinate cases of diabetes, also in diarrhœa, the primæ viæ having been previously emptied by means of laxatives. It may be conjoined with opium or aromatics, but astringent vegetables are incompatible with it, as are the alkalies and alkaline salts, whose bases will unite with sulphuric acid, and precipitate the alumina.

Composition.—According to Dr. Thomson, alum contains

3	equivalents sulphate of alumina,	$58 \times 3 = 174$
1	 sulphate of potassa	$= 88$
25	 water	$9 \times 25 = 225$
		—
		Equivalent.....487

Most commonly it is employed as a local applicant. The compounds directed to be kept in the pharmacy of this institution are as follow :—

PULVIS ALUMINIS COMPOSITUS, *Compound Powder of Alum.*

Take of Alum, in fine powder.....1 part
 Carbonate of Zinc, do.4 parts
 Mix them.

This is intended as an application to be sprinkled over ulcerated heels, &c. The decomposition which takes place on the contact of moisture materially influences the action of the compound. By the carbonic acid gas which is evolved, the foetor is destroyed, whilst the sulphate of zinc formed acts as an excitant and astringent; its potency being checked by that portion of the carbonate which suffers no change.

SOLUTIO ALUMINIS, *Solution of Alum.*

Take of Alum1 part
Water.....16 parts

Dissolve.

UNGUENTUM ALUMINIS COMPOSITUS, *Compound Ointment of Alum.*

Take of Alum finely powdered
Turpentine, of each1 part
Hogs' Lard.....3 parts

Melt the lard and turpentine together in a water bath, and when nearly cold add the alum.

The union of an astringent with a digestive may appear somewhat incongruous; but from a very long trial of the compound, it has been retained. In inflammation and suppuration of the skin of the heels, commonly denominated grease, its use is advocated; and when judgment is exercised in its application, little more is called for.

Alum has also been employed with success in open joints, for which purpose it is made into a cataplasm with flour or meal. Its acid coagulates the albumen of the synovial discharge, and thus closes the opening ; therefore the coagulum should not be removed, as is too often done, but allowed to remain, in order that it may become organized.

In apthæ, a disease to which the attention of the profession has been lately drawn by Messrs. Price and Daws in "The Veterinarian," a weak solution of alum may be employed with advantage, and it likewise may be used as a collyrium in chronic ophthalmia.

Very finely pulverized, and mixed with its own or twice its weight of flour, it is a valuable styptic.

In America it is given in large doses for bots ; it is said to cause them to let go their hold, and they are then expelled by oleaginous purgatives. There still, however, remains the question, whether it is often necessary or advisable to hasten the removal of these parasites from the habitation which nature has assigned to them.

AMMONIA, *Ammonia*.

This compound has been designated the volatile alkali, in contradistinction to the fixed alkalies, soda, potassa, and lithia. It is abundantly given off during the decomposition of animal substances, and from

some few vegetable ones; but it is mostly obtained from the former.

<i>Composition.</i> —1 equivalent nitrogen	= 14
3 equivalents hydrogen ...	= 3
	—
Equivalent.....	17

Properties and Uses.—Ammonia, at the ordinary temperature of the air, is gaseous, but exposed to a pressure of six and a half atmospheres, it becomes a liquid. It is transparent and colourless, easily detected by its pungent odour, or by bringing a rod dipped in hydrochloric acid near it. It neither supports respiration nor combustion—possesses the leading characters of an alkali—is rapidly absorbed by water—and by union with acids forms several salts. In a nascent state it is occasionally used as a local stimulant, but more commonly for this purpose it is beneficially combined with camphorated spirit and oil of turpentine, in equal parts. Its compounds directed to be employed are,—hydrochlorate of ammonia, sesqui-carbonate of ammonia, water of ammonia, and solution of the acetate of ammonia.

AMMONIÆ HYDROCHLORAS, *Hydrochlorate of Ammonia*. Old Names: Muriate of Ammonia, Sal Ammoniac.

The name by which this salt is familiarly known in the arts, sal ammoniac, was derived from its being found near the temple of Jupiter Ammon. It is still procurable in the neighbourhood of volcanoes in a state of efflorescence, or in groups of small needle-like crystals. The market at one time was wholly supplied from Egypt, where the soot of camels' dung by sublimation was made to yield it; but now it is obtained by the distillation of animal matters, for which purpose bones, and other animal remains, cut into pieces and boiled in order to extract the fat, are placed in an iron cylindrical still, to which is attached a receiver. Heat being applied, there pass over an empyreumatic oil and an impure solution of the carbonate of ammonia. The oil being removed, to the alkaline solution is added sulphate of lime, when the sulphuric acid leaves the lime and combines with ammonia, forming a soluble sulphate of ammonia, whilst the carbonic acid of the carbonate of ammonia unites with the lime and forms an insoluble carbonate of lime, which is precipitated. To the sulphate of ammonia in solution is added common salt (chloride of sodium), which becomes an hydrochlorate of soda, by the oxygen of the water going to the metal and

the hydrogen to the chlorine. A double decomposition now takes place; the sulphuric acid unites with the soda, and the hydrochloric acid with the ammonia, and two new salts are formed, both of which are in solution: these are to be separated by careful evaporation. The sulphate of soda crystallizes first, and, being removed, the heat is still continued until crystals of hydrochlorate of ammonia begin to form: as soon as this takes place the heat is withdrawn, and the crystallized mass is afterwards sublimed.

Another method by which this compound is prepared on the large scale, and the one now usually had recourse to, is that of adding hydrochloric acid to the impure solution of carbonate of ammonia, which is obtained during the preparation of coal gas, the salt being purified by repeated sublimations. Or, by the reaction of sulphate of lime and chloride of sodium on the solution, as already given.

Composition.—Independent of the water of crystallization, hydrochlorate of ammonia consists of

1 equivalent hydrochloric acid	=	37
1 equivalent ammonia.....	=	17
		—
Equivalent.....		54

Properties and Uses.—Hydrochlorate of ammonia occurs in concavo-convex cakes of from two to more inches in thickness. It is colourless, striated, and unacted upon by the air when pure, inodorous, and has

a salt, bitterish, and cool taste. It possesses some ductility, and, therefore, is not easily pulverized. Its specific gravity is 1.450. It is soluble in rather less than three parts of water at 60°, and in its own weight of boiling water: at 300° it sublimes without decomposition. It is used as a topical remedy to lessen inflammatory action, since the generation of cold whilst the salt is undergoing solution is great. This is increased by the addition of an equal weight of the nitrate of potassa, as follows:—

LOTIO REFRIGERANS, *Cooling Lotion.*

Take of Hydrochlorate of Ammonia, in powder,

Nitrate of Potassa, in powder, of each, 1 part

Water16 parts

The solution is to be employed as soon as made, otherwise it acts as a stimulant. Cloths are dipped into it and laid wet on the inflamed part, renewing them as soon as they become warm. A more effectual plan would be to immerse an evaporating lotion, consisting of 2 parts of rectified spirit and 16 parts of water, in a mixture of this kind, when its temperature would be considerably lowered, and on its application the benefit derivable from the direct application of cold, as well as that which results from evaporation, would be obtained.

Occasionally it is employed to disperse indolent tumours, or as a stimulant in chronic sprains.

LOTIO DISCUTIENS, *Discutient Lotion.*

Take of Hydrochlorate of Ammonia.....1 part
Diluted Acetic Acid.....8 parts
Camphorated Spirit1 part

Mix together, so as to form a lotion. This need not be used as soon as formed, and may be applied with friction. When the quantity of the hydrochlorate has been increased, some blemish has ensued.

LIQUOR AMMONIÆ, *Solution of Ammonia.* Old Names: Water of Ammonia, Spirit of Sal Ammoniac.

For this the College of Physicians gives the following formula:—

Take of Hydrochlorate of Ammonia, 10 ounces
Newly burnt Lime 8 ounces
Water..... 2 pints

Put the lime, slaked with water, into a retort; then add the hydrochlorate of ammonia and the remainder of the water, and distil fifteen fluid ounces of solution of ammonia into a receiver.

Decomposition.—The simplest view taken is, that the lime attracts the hydrochloric acid, from its superior affinity, setting the ammonia free, which rising with the water in distillation, they are condensed in the receiver, forming water or solution of ammonia.

The more complex but correct decomposition is represented in the following diagram :—

<i>Materials.</i>	<i>Constituents.</i>	<i>Products.</i>
Hydrochlorate of Ammonia..... = 54	Ammonia..... 17	Ammonia 17
	Hydrochloric Acid {	Water 9
Lime..... = 28	Oxygen..... 8	Chloride of Calcium 56
	Calcium 20	

Composition.—This will depend upon its specific gravity, and this upon the quantity of ammoniacal gas absorbed. Mr. Phillips says, that if prepared according to the form above given, its specific gravity is .960, and it will consist of 10 parts ammoniacal gas, 90 parts of water in 100.

Properties and Uses.—Solution of ammonia is a transparent and colourless fluid, having a strong pungent odour, and an acrid taste. It is stimulant, antacid, and rubefacient: as the latter, it is most commonly employed in combination with oil, forming a saponaceous compound, which may with advantage be used in sore throats, chronic tumours, sprains, and deep-seated inflammations.

LINIMENTUM AMMONIÆ, *Liniment of Ammonia.*

Take of Water Ammonia.....1 part

Olive Oil.....2 parts

Mix together, so as to form a liniment.

AMMONIÆ SESQUI-CARBONAS, *Sesqui-carbonate of Ammonia*. Old Names: Subcarbonate of Ammonia, Carbonate of Ammonia, Volatile Salt.

Take of Hydrochlorate of Ammonia.....1 pound

Dried Prepared Chalk.....1½ pound

Pulverize them separately; then mix, and sublime with a gradually increased heat, until the retort becomes red hot.

Decomposition.—A double decomposition of the materials by the agency of heat takes place. The calcium of the chalk goes to the chlorine of the hydrochloric acid, while the carbonic acid is attracted by the ammonia, and water is the result of the union of the hydrogen and the oxygen. The following diagram will further assist:—

<i>Materials.</i>	<i>Constituents.</i>	<i>Products.</i>
Hydrochlorate of Ammonia = 54	Ammonia..... 17	Carb. of Am. 39
	Hydrochloric { Hydrogen 1	Water.....9
	Acid { Chlorine.. 36	
Carbonate of Lime... = 50	Carbonic Acid..... 22	
	Lime { Oxygen 8	
	{ Calcium 20	Chloride of Calcium....56

Composition.—In the diagram above given it is supposed that the two neutral compounds mutually decompose each other, and the result should be two new neutral compounds; but it appears that during

sublimation three equivalents of each undergo decomposition, when one equivalent of ammonia, and one of the water formed, are dissipated; whilst the carbonic acid being undiminished, the resulting compound consists of three equivalents carbonic acid, two of ammonia, and two of water; or,

$1\frac{1}{2}$ equivalent carbonic acid	=	33
1 equivalent ammonia ...	=	17
1 equivalent water	=	9
		—
Equivalent.....		59

Properties and Uses.—Sesquicarbonate of ammonia has a pungent odour, and an acrid, cool taste. It occurs in striated, semi-opaque, colourless masses, which effloresce on exposure to the air, and become changed into a bicarbonate. It is soluble in four parts of water at 60° , and its own weight of warm water. Hot water decomposes it with effervescence. It is also decomposed by the acids, by all acidulous and some metallic salts; and by the fixed alkalies and their carbonates. It is employed in veterinary practice mostly as a diffusible stimulant. Its primary action is on the nerves of the stomach, which it excites, and this excitation is propagated over the system. It is occasionally given in doses of from $\mathfrak{z}\text{ij}$ to $\mathfrak{z}\text{iv}$, in the form of ball, in cases of pneumonia, which have been allowed to go on until congestion of blood has

taken place, and when all the other symptoms, except the pulse, warrant the use of the lancet; and when, should a vein be opened, the blood would but trickle slowly from the orifice. By it the action of the heart is roused, and blood may be abstracted.

LIQUOR AMMONIÆ ACETATIS, *Solution of Acetate of Ammonia.* Old Names: Water of Acetate of Ammonia, Mindererus's Spirit.

Take of Sesqui-Carbonate of Ammonia, $4\frac{1}{2}$ ounces, or
as much as is sufficient

Diluted Acetic Acid4 pints

Add the salt to the acid till saturated, or a neutral solution is the result.

Decomposition.—The acetic acid, from its superior affinity, attracts the ammonia, whilst the carbonic acid is liberated in a gaseous state.

Composition.—A solution of acetate of ammonia in water.

Properties and Uses.—A colourless solution, inodorous, and slightly nauseous to the taste. Internally administered, it is a febrifuge and diaphoretic. It may be advantageously given with the nitrate of potassa in febrile affections, and will form a proper vehicle for the extract of the deadly nightshade in pulmonary and other diseases: dose from $\mathfrak{f}\mathfrak{z}\text{iv}$ to $\mathfrak{f}\mathfrak{z}\text{viij}$.

Although the question, Whether diaphoresis can

be excited in the horse? is not settled, nevertheless I feel it my duty to state my belief that it can, when assisted by heat; I mean the heat given off from the body, confined by clothing, otherwise the influence of the agents which we employ for the purpose will be determined to the kidneys, which emunctories in the horse are acted upon with ease and certainty. In some experiments instituted by me, in which a pint of this solution was repeatedly administered, I find recorded that the exhalents of the skin were increased in action by it, and the pulse lowered from 40 to 36 beats in the minute.

Externally it is employed as a repellent lotion, for which the following formula is given by Mr. Percivall:—

Take of Solution of Acetate of Ammonia,
Rectified Spirit, of each...4 ounces
Water.....1 pint

Mix together, so as to form a lotion, with which the inflamed part is to be kept constantly wetted.

ANCHUSA RADIX, *Alkanet Root.*

The plant affording this root is a perennial, and a native of the south of Europe. The market is supplied with it from France. The smaller roots should be chosen, as they are invested with the most bark, in which the colouring matter resides.

Properties and Uses.—The dried root is inodorous and insipid. It is wrinkled, and covered with a dusky

red bark, which imparts its colour very readily to oils, fat, and wax, &c., and on this account alone it is employed.

ANTHEMIDIS FLORES, *Chamomile Flowers*.

The chamomile plant is indigenous to Great Britain, a perennial, and growing in abundance upon dry waste lands. The market, however, is principally supplied with the flowers by the growers of medicinal herbs at Mitcham, in Surrey. As is the case generally, the plant by cultivation loses much of its activity; and, what is still more unfortunate, those flowers are preferred which possess the least virtue, the double kind being commonly sold in the shops, whereas the single ones are the best, from the medicinal qualities residing in the disc florets.

Composition.—Bitter extractive, resin, essential oil, tannin, and gallic acid.

Properties and Uses.—Chamomile flowers have a powerful grateful odour, and a nauseous bitter taste. These properties are abstracted by water and alcohol. They should not be kept more than twelve months, unless great care is taken to keep them perfectly dry. Their action is that of a mild tonic and carminative. They constitute, perhaps, one of the very mildest vegetable tonics. They may be given in doses of from $\mathfrak{z}$ ij to $\mathfrak{z}$ iv, in combination with ginger or other aromatics, once or twice a day. They will be found ser-

viceable where much debility remains after inflammatory attacks; also in cases of indigestion. With iron, or its salts, however, they are incompatible, as they contain gallic acid.

ANTIMONIUM, *Antimony*.

The metal, antimony, serves as the basis of several therapeutic compounds. It is commonly procured from the grey sulphuret by the process of reduction: it is of a white brilliant colour, with a bluish grey shade, slowly tarnishing by exposure to the air. It fuses at 810° F., and at high temperatures is volatilized. Its specific gravity is 6.702. Atomic weight, 65.

ANTIMONII SESQUI-SULPHURETUM, *Sesqui-sulphuret of Antimony*.

The term antimony, amongst horsemen, has been applied to this compound. It is the grey ore, the most common of all the antimonial ores, found in France, Spain, England, Scotland, and many other places. The market is chiefly supplied from Germany and Holland. The process which it goes through is simply this:—the adventitious substances with which the mineral is commixed are separated as much as possible by the hand. The ore being then broken into fragments, is placed in a reverberatory furnace, covered with charcoal, and exposed to a low red heat, when the sulphuret fuses,

and the remaining earthy portions floating on the surface are removed by a rake, whilst the fluid parts are let run into moulds. Sometimes the ore is put into a pot perforated with holes, which is placed within another, and these being introduced into the furnace, the sulphuret melts and percolates through the first into the second, leaving the extraneous matters behind. It then constitutes the crude antimony of commerce, which is of a crystalline structure, massive, and of a greyish steel colour, inodorous, insipid, and insoluble in water and alcohol.

<i>Composition.</i> —1 equivalent antimony = 65	
1½ sulphur.....	= 24
	—
Equivalent.....	89

Properties.—The sesqui-sulphuret of antimony has been extolled as an alterative. Its action depends, in a great measure, upon the state of the stomach and bowels; for if much acid exists in them, its operation will sometimes be violent. Its administration, therefore, should be preceded by the exhibition of a laxative. It has been given in doses from $\mathfrak{z}_{ss}$ to $\mathfrak{z}_j$ in the animal's provender, but most commonly and most advantageously it is combined with sulphur and the nitrate of potash, forming a compound much in request by stable-men. It is not an objectionable compound when given with caution.

As it occurs in the shops, it sometimes contains other substances, such as lead, arsenic, manganese, and iron. The presence of lead is indicated by the texture being foliated rather than striated: of arsenic, by the garlic-odour, when a portion is projected on live coals; of manganese and iron, from its not being vaporizable: these are the ordinary tests. Of course, where minute investigation is necessary, others may be had recourse to.

In the state of powder it should never be purchased, but in conical masses, as obtained from the hands of the purifier, since it is frequently mixed with the carburet of iron and some other substances after pulverization.

ANTIMONII POTASSIO-TARTRAS, *Potassio Tartrate of Antimony*. Old Names: Tartarized Antimony, Emetic Tartar.

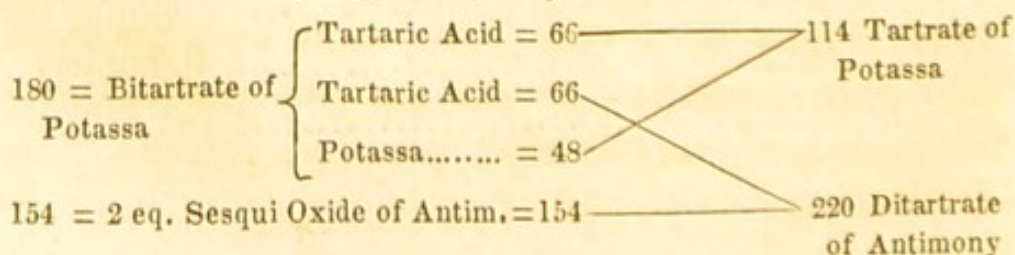
The following form is given by the College of Physicians:—

Take of Sesqui-sulphuret of Antimony, in powder
Nitrate of Potassa, powdered, of each 2 pounds
Bitartrate of Potassa, powdered.....14 ounces
Hydrochloric Acid.....4 fl. ounces
Distilled Water1 gallon

To the sesqui-sulphuret of antimony and nitrate of

potassa, mixed intimately together, add the hydrochloric acid; and having spread the powder upon an iron plate, ignite them. When cold, rub what remains to a very fine powder, and wash it with boiling water until tasteless. Mix this with the bitartrate of potassa, and boil for half an hour in a gallon of distilled water. Strain the liquor while hot, and set it aside that crystals may form. These being removed, again evaporate, that it may yield other crystals.

Decomposition.—By the combustion of the sesquisulphuret of antimony and nitrate of potassa in combination, are formed sulphate of potassa and a sesquioxide of antimony, whilst some portion of the sesquisulphuret remains unacted upon. The hydrochloric acid prevents the formation of any sulphuret of potassium, and also the disengagement of free potassa. By washing, the soluble salts are removed, and there remains behind a sesquioxide of antimony, with a portion of unacted upon sesquisulphuret. This being boiled with the solution of bitartrate of potassa, the equivalent of acid in excess combines with two equivalents of sesquioxide of antimony, and the remaining equivalent retains its union with the potassa, and these combining together, crystallize as a double salt.



Composition.—When crystallized, potassio tartrate of antimony consists of

1 equivalent tartrate of potassa ...	=	114
1 equivalent ditartrate of antimony	=	220
3 equivalents of water	9×3	= 27

Equivalent.....361

It occurs in octohedral crystals, which slightly effloresce on exposure to the air. They have a styptic taste, and are soluble in 15 parts of water at 60°, and 3 parts at 212°. In the state of crystal the compound should be at all times purchased.

Properties.—I should be much pleased if I could reconcile the conflicting statements respecting this salt. Most practitioners employ it, yet have I not been able to obtain from any one of them a satisfactory account of its action. It is commonly given as a febrifuge. Sir B. Brodie has ascertained that when given to animals in large doses, it possesses sedative powers, evidenced by its influence on the heart, controlling the force of the circulation, and that to such a degree that in some instances the heart almost ceased to beat, and the blood to flow. It has been suggested by Mr. J. Turner, that, although it may not produce actual diaphoresis in the horse, it restores the function of the exhalents of the skin, and thus proves serviceable. There is much plausibility in this. Its

very general use would almost warrant one to conclude, that good results from its employment. I have given it both in repeated small and large doses, for a considerable time; and the only action which I saw manifested was that of a sedative, the pulse being lowered by it four in a minute, and its tone softened. It is extolled as a vermifuge in a dose of from $\mathfrak{z}\text{j}$ to $\mathfrak{z}\text{ij}$ given at night, an aloetic purge being administered on the next morning. Others, with a great deal more advantage, give it in doses of a drachm, or a drachm and a half, on six successive mornings, and always before the horse is fed. On the seventh day a dose of physic is administered. Few worms, it is said, appear after this.

Externally applied, it has been recommended by Mr. Simpson and Mr. Gloag in chest affections. The form in which it may be used is in combination with lard, in the proportions of from $\mathfrak{z}\text{j}$ to $\mathfrak{z}\text{ij}$ to $\mathfrak{z}\text{j}$ of the latter. Considerable friction having been used in its application, it is certainly a very powerful irritant, exciting much pustular eruption on the skin, and therefore may be serviceable in many deep-seated inflammations. Its operation, however, is painful; and I have found that it causes, when extensively applied, much disorganization of the part, deeply deranging the structure beneath, and producing an unsightly suppurating sore; nevertheless, in the hands of the

scientific practitioner, it affords an agent which may be employed when the use of cantharides or terebinthinate compounds is contra-indicated.

I would beg to add, that as it respects the effects resulting from the administration of this agent, I shall feel much indebted to any practitioner who will furnish me with the result of his experience. Of course, I mean when given alone. I am aware that it is commonly exhibited combined with the nitrate of potassa and camphor, and I doubt not that a useful compound is obtained. The form is denominated "a fever ball," of which the following may be taken as a type :—

Take of Potassio-tartrate of Antimony

Camphor, of each.....half a drachm

Nitrate of Potassa.....two drachms

Common Mass, a sufficient quantity to form a ball for one dose.

There remains another compound of antimony to be noticed, although it no longer has a place in modern pharmacopœias ; the hydrochlorate, or the muriate, or butyr of antimony, as it was designated.

The easiest method of procuring it is by digesting in a glass vessel 100 parts of hydrochloric acid and 20 parts of sesqui-sulphuret of antimony in fine powder. The heat is to be gradually increased until all effervescence ceases, and then the mixture is to be boiled

for an hour. The solution contains an excess of acid. It should be filtered when cold; or allowed to remain at rest, so that all the sulphuret unacted upon may be deposited.

This is much praised by those who use it as a superficial caustic; and certainly it is a valuable one. Its effect can be accurately ascertained by the change of colour in the part to which it is applied. Its employment is advocated in corns, canker, and other diseases of the feet, indicating unhealthy action, and particularly for foot-rot in sheep.

ARGENTI NITRAS, *Nitrate of Silver.*

Vulgo: Lunar Caustic.

Take of Silver.....one ounce and a half

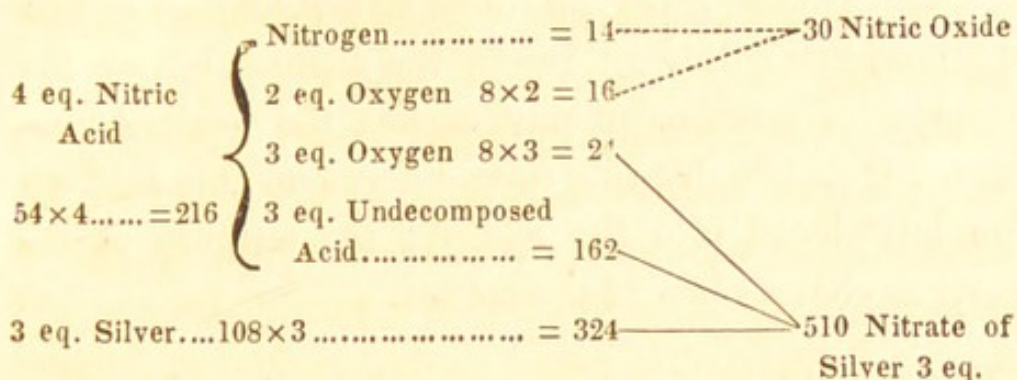
Nitric Acid.....a fluid ounce

Distilled Water...two fluid ounces

Mix the acid and the water together, and dissolve the silver in them by means of a sand-bath. Then gradually increase the heat, that the nitrate of silver may be dried. Melt this in a crucible with a slow fire, until, the water being expelled, ebullition ceases; then pour into proper moulds.

Decomposition.—A portion of the acid becomes decomposed, being resolved into nitric oxide gas, which escapes into the air and forms nitrous acid fumes, and oxygen which combines with the silver;

this oxide is dissolved by the remaining undecomposed acid, and a nitrate of silver is the result.



Composition.—1 equivalent nitric acid ... = 54
 1 equivalent oxide of silver = 116

Equivalent.....170

Properties and Uses.—Nitrate of silver occurs in the shops in the form of small cylinders, enveloped in white or blue paper, which on being broken, present a greyish crystalline structure. It should suffer no change by exposure to the air. If it deliquesces, it may be suspected to contain copper, which may be proved by its solution in ammonia. It stains the skin, hair, and whatever it touches black, owing to the reduction of the nitrate. Externally applied, it is a caustic, and both a manageable and a powerful one. It has found in Mr. Youatt an able advocate, who also gives it internally as a tonic to the dog, in cases of chorea, the dose being from an eighth to a quarter of a grain. A dilute solution may be em-

ployed as an excitant to wounds. For this purpose, ten grains or more may be dissolved in a fluid ounce of distilled water. A few fibres of tow, dipped in this solution, being drawn through the channel left on the removal of a seton, quickly excites the healing process. Occasionally one or two drops of this solution are introduced into the eye, for the purpose of removing opalescence of the cornea.

BELLADONNÆ EXTRACTUM, *Extract of Deadly Nightshade.*

This is the inspissated juice of the leaves of a plant indigenous to Britain and the south of Europe. It is found growing in shady places, where the soil is calcareous, flowering in June, and ripening its seed-vessels in September. The roots are said to possess the most activity, although the leaves are commonly employed medicinally. In order to prepare the extract, these are bruised in a mortar, a little water being poured over them, then submitted to pressure, and the juice evaporated until it has acquired a fit consistence.

Composition.—An alkaloid, denominated atropia, and those proximate principles of the vegetable which are soluble in water.

Properties and Uses.—The odour of this extract is peculiar, and its taste bitter. Its action is that of a narcotic, relieving pain and lessening both the force

of the pulse and the number of its beats. Mr. Mavor, of Bond Street, who employs it largely, speaks highly of it, as do many other practitioners. It is given in doses of from two to four drachms, combined, when admissible, with the nitrate of potassa. In larger doses it acts gently on the bowels. Externally it is sometimes applied to the eye, and by its influence on the radiated fibres of the iris, it dilates the pupil. The same effect I have witnessed from a large quantity administered internally.

BOLUS ARMENIA RUBRA, *Armenian Bole.*

This should be an earth obtained from Armenia. It is argillaceous, of a deep red colour, and contains a small portion of the peroxide of iron; but red chalk, ground and made into cakes, is now largely substituted for it in the English market.

Many of these earths were formerly used in medicine, and they were much prized on account of their absorbent and astringent properties: this alone remains, and it is employed almost wholly for the sake of its colour. The celebrated earth of Lemnos, as Galen describes it, was periodically dug with great ceremony; and even at this day the pit is annually opened with solemn rites by the priests on the 6th day of August, six hours after sun-rising, when a portion of the clay is taken out, washed, dried, and sealed with the Grand Seignior's signet: hence this has re-

ceived the name of sealed earth; and the term was applied to many others.

Armenian bole is still advocated by those of the old school; but the moderns can do very well without it.

CALX CHLORINATA, *Chlorinated Lime.*

This term is applied by the College of Physicians to the compound of chlorine and lime, long known in the arts by the name of chloride of lime, or bleaching powder. It is made by passing a stream of chlorine gas (obtained by the action of sulphuric acid on the chloride of sodium and peroxide of manganese, or by the decomposition of hydrochloric acid by means of the peroxide of manganese) through hydrated lime placed on shelves in a chamber, the lime being kept in agitation by a spindle having cross arms attached to it. When the lime has ceased to absorb chlorine, the compound is removed.

Composition.—This has not yet been accurately determined. Dr. Thomson asserts that in Glasgow a compound is obtained, consisting of one equivalent of chlorine, and one equivalent of hydrate of lime; but as ordinarily procured, according to Brande, Phillips, and others, chlorinated lime consists of

1 equivalent chlorine	= 36
2 equivalents hydrate of lime 37×2	= 74

Properties and Uses.—Chlorinated lime is in the form of a white powder, emitting a weak smell of chlorine, and having an acrid caustic taste. It is only partially soluble in water; the lime which is uncombined with chlorine remaining comparatively unchanged. When exposed to the air, it is decomposed: chlorine is evolved, and a carbonate of lime is formed.

It is a valuable disinfectant. In order to understand its action, it is necessary to bear in mind that the fetid gases given off during the decomposition of vegetable and animal substances are mostly compounds of hydrogen with certain bases. When chlorine is brought into contact with these, it decomposes them, in consequence of the great affinity it has for hydrogen, with which it unites, and sets the bases free.

Mr. Youatt in 1828, and afterwards Mr. Simpson, Mr. Holford, and Mr. Kerr, in the pages of “The Veterinarian,” have drawn the attention of veterinary surgeons to this valuable compound in fistulous affections, open joints, and in cases of grease*. But this compound will be found serviceable in many

* I have found the use of the following ointment attended with the best results in this last named disease:—

Unguentum Calcis Chlorinatæ (Ointment of Chlorinated Lime.)

Take of Chlorinated Lime1 part

Hogs' Lard8 parts.

Mix together, so as to form an ointment.

other diseases. To Mr. Youatt we are indebted for its introduction as a remedy in hoven in cattle and tympanitis in the horse, being given in doses of from $\mathfrak{z}\text{ij}$ to $\mathfrak{z}\text{iv}$ dissolved in water. A solution of it, in the proportion of a pound to a gallon of water,* is recommended as an application for mange, by Mr. Lucas, of Liverpool. Even as an ordinary excitant of wounds, it may be employed with benefit, and particularly in such as have taken on unhealthy action. In fact, I feel assured, that the more this compound is known, the more highly will it be prized.

It will be found extremely useful for purifying stables rendered foul by the virus of glanders, mange, or any other contagious disease, the walls being washed with a diluted solution of it. The common practice of merely whitewashing the walls serves only to cover the infectious matter, and perhaps to preserve it for an indefinite length of time, so that, when the lime scales off, disease may be again engendered by the exposed virus.

CAMPHORA, *Camphor*.

This may be viewed as a concrete essential oil. Its sources are principally two—a camphor laurel, growing abundantly in the woods of North America, China, and Japan, from the roots and smaller branches of

* This is the strength of the solution usually kept in the pharmacy.

which it is obtained by distillation; and a tree which is found in the forests of Sumatra and Borneo, in the centre of which, when arrived at maturity, the camphor exists in a concrete state, occupying the space usually filled in other trees with pith. The young trees yield only an oil, which resembles a solution of camphor in oil of turpentine.

Camphor, as it is brought into the market in its crude or rough state, is very impure. It is purified by sublimation in glass vessels, adding a little quick lime to it.

Composition.—It is a proximate vegetable principle, closely allied to the essential oils in its constitution.

Properties and Uses.—Camphor is sold in concavo-convex cakes, of two or three inches in thickness. It is white and brittle, pulverizing, however, with difficulty, from its unctuous nature, without a little alcohol be added. Its odour is agreeable and penetrating; its taste bitter and aromatic; it is sparingly soluble in water, on which it swims, but readily so in alcohol, the fixed and volatile oils, and strong acetic acid. It is inflammable, and burns with much smoke. Camphor is a narcotic, and may be given in doses of from $\mathfrak{z}\text{j}$ to $\mathfrak{z}\text{ij}$. It diminishes the frequency of the pulse and softens its tone. If long exhibited, it acts on the kidneys; at least such were the effects I perceived to

result from some experiments which I made, in order to ascertain its action. I therefore do not object to its being employed as a febrifuge, in combination with the nitrate of potassa. Externally applied, it has been extolled as a stimulant for sprains, bruises, and tumours; for which purpose one part of camphor may be dissolved in four parts of oil or rectified spirit; and this may be rendered more potent by the addition of a little essential oil of turpentine. Another form under which to employ camphor is, the compound liniment of soap. Added to either the ointment or liniment of cantharides, it considerably allays the irritation caused by the flies, and is consequently a valuable adjunct.

CANTHARIS, *Cantharides*, *Blistering-fly*. Vulgo:
Spanish fly.

The name of Spanish flies was given to these insects because they were first brought from Spain. They abound in the south of Europe; occasionally single specimens have been caught in England, and lately Belgium has been visited by vast numbers. They are found on different trees; such as the ash, elder, poplar, lilac, privet, and Tartarian honeysuckle, which they soon deprive of verdure. They are dislodged by shaking the trees, and afterwards killed by exposure to the fumes of boiling vinegar, and then dried in the

sun. Their existence is known in a locality by the offensive odour emitted, and which sensibly affects many persons. The market is now principally supplied from Sicily.

Composition.—This is involved in some obscurity. The active principle of the fly has been designated cantharidine. It is obtained by treating a decoction of the fly first with alcohol and afterwards with ether, and it occurs in small crystalline plates, having an appearance not unlike spermaceti: besides this essential principle, there have been found by Robiquet, phosphate of lime and magnesia, a little uric and acetic acids, a concrete fixed oil, and a volatile oil. In these last the cantharidine is held in solution. Cantharidine, when pure, is not soluble in water or alcohol, but is readily so in æther or oil. When, however, it exists in its native combination with a yellow volatile oil, forming a saponaceous compound, it may be dissolved in both these menstrua.

Properties and Uses. — Cantharides should be chosen small and perfect, about two-thirds of an inch in length, and one-fourth in breadth; oblong in form, and of a shining golden green colour; dry, free from dust and mould, and unpreyed upon by an acarus or mite. Despite, however, of all precautions, this parasite will be found, at times, feeding on the parenchymatous part of the insect, but it appears to leave untouched the acrid principle.

Administered internally, they act as a powerful diffusible stimulant and diuretic. Externally they are vesicants. Of late they have come more into general use, from their having been recommended by Mr. Vines, in combination with the vegetable bitters, as a stimulating tonic, in cases of debility accompanied or not with anasarca; also in farcy and glanders, and some other affections. To him the veterinary profession is indebted for the steadiness with which he has followed up their employment, and from which much benefit has been derived. The dose is from five to eight grains, given daily; but whenever diuresis supervenes, it is to be withheld for a day or two. As an ordinary diuretic, cantharides are seldom given, since they have a peculiar tendency to irritate and inflame the neck of the bladder, and occasion strangury.

Their great consumption is as vesicatories. When applied to the skin, they inflame it, and cause the exhalents to pour out a quantity of serum, which raises the cuticle from the cutis, forming a blister; and this they do more certainly and effectually than any other agent. The formulæ given for blistering compounds are exceedingly numerous, but the less complicated they are the better. The following are those of the College, which will, I believe, include all that can be required. In action they increase with the order in which they are placed; and if to each form

be added camphor in the proportion of one part to eight, the irritative effects will be much lessened, and the compounds rendered more elegant.

ACETUM CANTHARIDIS, *Vinegar of Cantharides.*

Take of Cantharides, in powder.....1 part
Diluted Acetic Acid.....8 parts
Macerate for fourteen days, and filter for use.

LINIMENTUM CANTHARIDIS, *Liniment of Cantharides.*

Take of Cantharides, in powder.....1 part
Olive Oil.....8 parts
Digest in a water-bath for two hours, then filter for use.

UNGUENTUM CANTHARIDIS, *Ointment of Cantharides.*

Take of Cantharides, in very fine powder
Common Turpentine, of each, 1 part
Hogs' Lard.....4 parts
Melt the lard and turpentine together in the water-bath, and then add the flies, stirring until cold.

CAPSICI BACCÆ, *Capsicum Berries.*

The capsicum plant is a native of the East and West Indies, but largely cultivated in England, both as an ornament and for the sake of its berry or fruit,

which is a conical pod of an orange colour, containing a dry pulp and many flattish seeds.

Composition.—Cinchona, resin, mucilage, and a peculiar acrid principle.

Properties and Uses.—This well-known condiment is introduced as an article of the materia medica, for the sake of its powerful stimulating properties. It excites a genial glow in the stomach, which is imparted to the system generally, but the pulse is seldom accelerated by it. It may be given in doses of from gr. x to xx.

CARUI SEMINA, *Caraway Seeds.*

The plant yielding these seeds is indigenous to Great Britain. In Essex it is largely cultivated for the sake of its seeds, which are perfected in the second year of its growth, in the month of July or August, when the umbell is thrashed out on a cloth. In the market seeds are met with of foreign importation, but the English are preferred.

Properties and Uses.—Caraway seeds are of a brown colour, curved, ridged, and about one-fourth of an inch in length. They should be chosen fresh and plump. They have an aromatic odour, and an agreeable, sweetish, warm taste; depending on the presence of an essential oil, in which resides their activity. They are carminative and stomachic, and may be given in doses of from ʒss to ʒj. For cattle the dose is

from $\mathfrak{z}\text{ij}$ to $\mathfrak{z}\text{iv}$. They may be fairly allowed to take the place of the whole tribe of seeds, such as anise, cummin, coriander, and others, which were so liberally employed by the old practitioner. They should be ground only when about to be administered, and for this purpose a hand-mill will be found highly serviceable.

CASCARILLÆ CORTEX, *Cascarilla Bark*.

The tree yielding this bark is a native of the Bahama islands, and is also found in Jamaica and St. Domingo. It comes into this country packed in chests and bales.

Composition.—Bitter principle, mucilage, resin, volatile oil, water, and much woody fibre.

Properties and Uses.—Cascarilla bark is in the form of curled pieces or quills of a brownish colour, and covered with a thin epidermis beset with lichens. It has an agreeable spicy odour, and breaks with a short close fracture: when burnt, it emits the smell of musk. It is both tonic and aromatic, and may be given in doses of from $\mathfrak{z}\text{ij}$ to $\mathfrak{z}\text{iv}$. I have been led to introduce this agent from the recommendation of it by Mr. Rogers, of Exeter, who employs it with much advantage, and speaks highly of its effects.

CATAPLASMA, a *Poultice*.

This is usually classed among emollients. The common relaxant cataplasm of the College consists of

bran moistened with warm water, to which is added a little linseed meal, in order to give it tenacity. Care should be taken that it be kept moist, which may be effected by pouring over it, from time to time, warm water. I am not inclined to assent to the position, that it is of little moment whether you apply a poultice hot or cold, because it will soon become of the same temperature as the part to which it is applied. In the effects produced by medicinal agents, the impression first made by them is of some moment. When a cold substance is applied to an inflamed surface, there will necessarily be a withdrawal of heat from it; the constringing effects of cold will be experienced, and much pain. On the other hand, when warmth, accompanied by moisture, is applied, the particles are driven farther from each other, the part becomes relaxed, the distended vessels are enabled to relieve themselves, and ease is obtained. Sometimes, however, a cold poultice is desirable, and then even ice may be applied. The effects produced by poultices depend very much upon the materials composing them. Thus, as a means of softening horn in inflammations of the feet, vinegar may be used instead of water. When an astringent is desirable, a solution of alum may be added. When a disinfectant, the chloride of lime is invaluable; or a poultice containing yeast or charcoal may be employed. A boiled carrot poultice has been found of service in ill-conditioned ulcers and

irritable sores ; and we have in the mustard cataplasm, made by mixing together equal parts mustard and linseed meal, with a sufficient quantity of boiling vinegar, an excellent stimulating compound. If we are desirous of allaying irritation, opium or the diacetate of lead may be mixed with the common cataplasm ; so that in this, as in all the other branches of the practice of physic, judgment on the part of the medical attendant is imperiously called for.

CATECHU EXTRACTUM, *Extract of Catechu.*

This substance was originally brought from Japan, and was supposed to be an earth ; hence it received the name of Terra Japonica, Japan earth. It is now known to be an extract obtained from a tree—the *Acacia Catechu*—which grows plentifully in India, particularly in the mountains of Kauhana in Hindostan. Its mode of preparation is this :—The tree being felled, the exterior white wood is removed, and the interior dark-coloured is cut into chips. These are put into narrow-mouthed unglazed vessels, and covered with water, which is evaporated to one-half by the application of heat : the decoction is now poured into a flat earthen pot, and further evaporated ; afterwards it is exposed to the sun, and, when it has obtained considerable thickness, it is spread upon a mat which has been previously covered with the ashes of cow-dung. Lastly, it is cut, by means of a string, into

portions, which are completely dried by frequently turning them in the sun.

The market is supplied with this extract both from Bombay and Bengal, and it comes in chests, boxes, or bags.

	Bombay Catechu.	Bengal Catechu.
<i>Composition.</i> —Tannin ...	109.....	97
Extractive	68.....	73
Mucilage	13.....	16
Impurities	10.....	14
	200	200

Properties and Uses.—It will be evident, on a reference to the constituents of each kind of extract, that the Bombay is the most valuable. They may be easily distinguished from each other: the Bengal is pale coloured, and is met with in flat, square, or round pieces; whilst the Bombay is in round masses, having a rusty iron hue without, and a chocolate tint within: its taste, also, is more austere and astringent. When pure, both are nearly dissolved either by water or spirit.

Catechu may be considered as the most valuable of the vegetable astringents, and is given in doses of from ʒj to ʒij. It is not uncommon to see opium directed to be employed in combination with it: this is injudicious, as a tannate of morphia is thrown down.

Frequently it is added to chalk, a mixture which is allowed, although the alkalies and their carbonates,

and also a solution of lime, cause precipitates. Aromatics are best united with it, when it is given in the form of ball, as follows :—

Astringent Mass.

Take of Extract of Catechu, in fine powder, and
Cinnamon Bark, of each℥j
Common Mass.....℥vj

Mix together, and divide into balls weighing an ounce each, one of which may be given twice or thrice in the day. When the diarrhœa is spontaneous, it will be advisable to exhibit a laxative before giving astringents, as this is frequently nothing more than an effort of nature to dislodge some offending matter.

CLYSTERS, or *Glysters*.

The common form of these agents for the horse is a liquid; occasionally, however, gaseous enemata are resorted to. The objects for which they are administered are,

1. In order to empty the bowels of fæces; thus they act as an aperient; also to induce a cathartic to commence its operation when, from want of exercise or due preparation, it is tardy in producing the desired effect. They operate in a twofold way: by softening the contents of the intestines, and exciting irritation in one portion of the canal, which is communicated

throughout the whole ; hence they become valuable when the nature and progress of the disease require a quick evacuation of the bowels.

The usual enema is warm water, the quantity thrown up being a gallon. This may be rendered more stimulating by the addition of common salt or oil.

The quantity of the fluid thrown up should be attended to ; for if this be too large, in addition to the action of the agent given, we shall have a distention of the intestine, and there will follow a more rapid expulsion of the clyster than is desirable ; and, on the other hand, it should not be too small, for then the object is not gained. Many are the methods adopted for exhibiting enemas—the best is certainly the pump invented by Mr. Reid.

2. For the purpose of killing worms, which are found nidulating in the rectum and large intestines. In this case they are usually of an oleaginous nature.

3. For restraining diarrhœa ; sedatives and astringents being employed.

4. For nourishing the body, when food cannot be received by the mouth. Gruel is generally the aliment.

5. For allaying spasms in the stomach and bowels. In this instance they become one of the means by which medicines are taken into the system.

The only gaseous enema is that of tobacco, which

is occasionally employed in cases of strangulated intestine or obstinate constipation of the bowels.

CRETA PRÆPARATA, *Prepared Chalk.*

Chalk is a most abundant mineral, occurring massive in beds which traverse a range of hills commencing in Yorkshire and continuing into Dorsetshire, and giving to the cliffs of Britain, on the southern side of the island, their peculiar character.

It is found of various colours, and is mixed with many impurities. For medicinal use, after having been levigated, the coarser particles and all adventitious matters are removed by washing; and when dried it becomes an impalpable powder.

Composition.—Chalk is a friable carbonate of lime, consisting of

1 equivalent carbonic acid = 22

1 lime = 28

—
Equivalent.....50

Properties and Uses.—Prepared chalk is of a white colour, tasteless, inodorous, insoluble, and adheres slightly to the tongue. As a medicinal agent it is placed amongst astringents, but in the strict meaning of the term it is not an astringent, as it does not condense nor corrugate animal fibre. Its action depends upon the chemical property it possesses of uniting with acids, and forming new compounds;

hence in diarrhœa, when an acid secretion is frequently poured out from the mucous follicles of the intestines, it neutralizes this fluid, and thus stays the profuse alvine evacuations by removing the cause. Sometimes, however, the immediate cause requires expulsion by the aid of a laxative, and afterwards the antacid is to be administered. The dose may be from ℥ij to ℥iv, suspended in a weak mucilage of gum. Opium may be added with advantage, and aromatics; and although substances which contain tannin are considered incompatible with it, yet by common consent, when we are desirous of obtaining its astringent effects, catechu may be combined.

As an external application, chalk will be found valuable as an absorbent and antacid, and may be sprinkled over ulcers discharging a thin ichorous matter, abrasions, &c.

CROTON TIGLII SEMINA, *Croton Seeds*.

The purging croton is a native of India, Ceylon, Java, China, and other places. Every part of the plant appears to possess medicinal properties; but the seeds are alone employed in Europe. These are contained in triocular capsules, each seed being oblong, and of the size of a small coffee bean. Its shell is black, and covered with a yellowish brown epidermis, which frequently is rubbed off by friction;

from the cases in which the seeds are imported, most commonly not being full.

The parenchymatous structure abounds with a fixed acrid oil, which is obtained by expression, constituting the croton oil—*tiglii oleum*—of commerce. It has a bright straw colour, a faint odour, and a hot acrid taste, creating an uneasy sensation in the throat, which continues for many hours.

Composition.—100 parts of the kernels of the seeds when bruised yield

60 parts of this oil

40 parts of farinaceous residue.

Or perhaps a better analysis is that of Dr. Nimmo :

27.5 acrid matter

32.5 fixed oil

40 farinaceous residue.

100

The fixed oil is merely a vehicle for the acrid principle, which is called *tiglii* by Dr. Paris, the whole of which cannot be expressed from the seeds, but a portion remains commixed with the farina. The employment of this residuum, denominated the croton cake, has been advocated by several practitioners ; but since great uncertainty must exist as to the quantity of the active principle which remains, I think it would be better to make use of the decorticated seeds.

I believe that the veterinary profession is indebted

to Mr. Field for the introduction of this agent as an article of its materia medica. He employs the farinaceous residue, and has found five grains of it equivalent in action to one drachm of aloes. Should the seed be given, about three grains, or perhaps a little less, may be considered an equivalent. The expressed oil has been said to create considerable irritation.

The great value of croton arises from the capability of administering it when no other cathartic can be given. It may be put into the animal's mash; or, if it is made into a tincture, as suggested by Mr. Field, it may be mixed with his water. A form for this is as follows:—

TINCTURA CROTONI, *Tincture of Croton.*

Take of bruised Croton Seeds...1 ounce

Rectified Spirits1 pint

Digest for seven days, and filter for use. Dose from half an ounce to an ounce.

A slight opalescence of the water in which it is administered will take place; and as long as this exists, the active principle may be considered as held suspended. Externally applied, this spirituous solution is an active counter-irritant; but I do not think it possesses any advantages over many others.

From having carefully noticed the action of this therapeutic, I am inclined to believe it requires nearly the same time to excite the bowels that aloes does.

It differs, however, from aloes, in not creating so much nausea, and in producing a greater liquidity of the dejections.

A knowledge of this would perhaps indicate its employment in anasaruous swellings and effusions into cavities, where purgatives are admissible; also in affections of the kidneys, when we are desirous to avoid irritating them, which is sometimes done when aloetic purges are exhibited.

As a general cathartic, croton will never supplant aloes. A combination of the two may perhaps be advantageous.

Lately it has been found that croton oil placed on the tongue in quantities of from 20 to 40 drops effectually produces purging. A knowledge of this fact is valuable, as there are some diseases incidental to animals in which neither a ball nor a draught can be administered, and it is desirable that the bowels should be acted upon.

CUPRUM, *Copper.*

This metal has been long known, it being employed by the ancients in place of malleable iron. It is found in most parts of the globe, but the richest copper mines exist in Cornwall. The ore most abundant is the sulphuret, from which the metal is usually extracted by reduction. This operation consists essentially in driving off the sulphur by heat, oxidizing the iron, and converting it into a silicate by means of

sand; when the copper is separated in a tolerably pure state. To render it pure, it undergoes repeated fusions, the last being carried on in the refining furnace with a little charcoal. After this it is beaten with hammers, and is then fit for sale. Animals feeding on the vegetable matter growing in the neighbourhood of these smelting furnaces are affected with many diseases: thus, about Swansea, their knees become enlarged, and their bones of a blue colour: in the language of the miners, they are "copper-smoked."

Pure copper has a yellowish-red colour, and much lustre. It emits a peculiar odour when rubbed, and has a disagreeable taste. It is hard, sonorous, and ductile. Specific gravity, 8.8. Atomic weight, 64.

CUPRI ACETAS, *Acetate of Copper*. *Ærugo*: *Verdigris*.

All the salts of copper are recognised by their blue colour. Verdigris is mostly made in those countries where wines abound, such as the south of France. Plates of copper are covered with the husks of the expressed grapes, which are moistened with water, and allowed to remain at rest, so that the acetous fermentation may be set up, during which the metal becomes oxidized, and the acetic acid disengaged combining with it, forms it into an acetate. This is scraped off, well beaten in mortars, and compressed into leathern bags, in which it is imported.

A purer acetate may be made by subjecting plates of copper to the action of acetic acid. In this country an artificial compound is formed by the mixture of sulphate of copper and acetate of lead; and, to render the deception more complete, stalks of raisins and pieces of metallic copper are added to it. Besides which, it is frequently adulterated with chalk, plaster of Paris, and other impurities, which are detected by dissolving the suspected compound in diluted sulphuric acid, which decomposes the verdigris, forming a sulphate; while the adventitious substances will be precipitated.

Composition.—Verdigris, according to Proust, consists of

43	acetate of copper
27	black oxide of copper
30	water

In 100 parts.

Others make it a mixture of

1	equivalent acetic acid		=	50
1		peroxide of copper	=	80
				130

Properties and Uses.—Verdigris occurs as a hard dry mass, crystalline, inodorous, and having an austere metallic taste. Boiling water takes up about one-fifth of its weight, the greater part of which is again de-

posited on cooling. Vinegar dissolves a much larger portion, and by evaporating the solution, rhomboidal crystals are formed, which are efflorescent in the air, and entirely soluble in water. This is called distilled verdigris. It is a biperacetate of copper, consisting of

1 equivalent peroxide of copper	=	80
2 acetic acid	=	100
Equivalent.....		180

With about a ninth part of its weight of water of crystallization.

Acetate of copper is a tonic, internally administered. Externally applied, it is an erodent and a detergent. The dose may be from $\mathfrak{zj}$ to $\mathfrak{zij}$. As an erodent, it is sprinkled in the form of a fine powder over luxuriant granulations. As a detergent, a liniment has been directed to be made with it; but I have adopted the suggestion of Mr. Bracy Clark, and substituted the sulphate of copper for the more expensive acetate, and have found it equally efficacious. A detergent ointment may be thus made:—

UNGUENTUM ÆRUGINIS, *Ointment of Verdigris.*

Take of Verdigris, in very fine powder, 1 part
 Common Turpentine, or Resin, 1 part
 Hog's Lard.....12 parts

The pulverized verdigris to be added when the other

ingredients are melted and removed from the water-bath, stirring together until cold.

Both this salt and its compounds may give place to that now about to be noticed.

CUPRI SULPHAS, *Sulphate of Copper.*

Old Names : Vitriolated Copper, Blue Vitriol.

The common names of this compound are familiar to most ; these are, blue-stone and blue vitriol ; nor are many unacquainted with this agent. But although this does not detract from its value as a therapeutic, yet at times it seems desirable that we should be enabled to disguise it.

It is prepared in several ways : the most common is by the evaporation of the water which flows from copper mines until a pellicle appears on its surface, and then setting aside to crystallize. Also by exposing the native sulphuret of copper to the action of heat, and afterwards to that of air and moisture, when the metal is oxidized and the sulphur acidified ; and these combining, form a sulphate, which may be obtained by solution, evaporation, and crystallization. Doubtless an analogous change to this takes place in the copper pyrites in the mines, by which the water becomes charged with the salt. It may be likewise procured by treating the oxide of copper with sulphuric acid, or by boiling copper filings in dilute acid, when

the acid suffers decomposition; sulphurous acid fumes are given off, the metal is oxidized, and then sulphatized. But by far the greater quantity of sulphate of copper is obtained from the impregnated water of mines, as first spoken of.

Composition.—According to the opinions of Berzelius, Prout, and Thomson, this compound is not a bisulphate of the peroxide, as it was once considered, but a sulphate of the black oxide, and consists of

1 equivalent protoxide of copper	= 40
1 sulphuric acid	 = 40
5 water	 $9 \times 5 = 45$

Equivalent.....125

Properties and Uses.—This salt occurs of a fine blue colour; its crystals are hard, of a rhomboidal figure, slightly efflorescent in the air, taste nauseous and metallic, and soluble in two parts of boiling water and four of cold.

It is incompatible with the alkalies and their carbonates, with many of the acetates, and all astringent vegetable infusions.

Sulphate of copper is an astringent and tonic. The dose may be from $\mathfrak{zj}$ to $\mathfrak{zij}$. The College directs its tonic mass to be thus made:—

Tonic Mass.

Take of Sulphate of Copper, finely pulverized...2 oz.

Root of Ginger, do.....2 oz.

Common Mass12 oz.

Beat together. Dose from 8 to 12 drachms.

It is, however, frequently given in much larger doses at this establishment, in cases of farcy and glanders. The former disease readily yields to it, but the latter too often proves obstinate. The quantity administered varies from $\mathfrak{z}_{ss}$ to $\mathfrak{z}_{j}$, this being given in solution, and blended with some demulcent, such as an infusion of linseed, or gruel. Mr. Sewell, to whom veterinary science is so much indebted, has ascertained by experiment that such doses as these cannot be given with impunity in the form of ball, as the agent will lodge on and corrode the stomach; he therefore recommends its exhibition in solution, commencing with the lesser quantity, and increasing it until slight loss of appetite is produced, which he considers indicates the maximum dose. This is steadily persevered in daily, abstaining, however, for a day or two, should the patient refuse food. I would respectfully ask, Would it not be better to divide the dose, so as to prevent this, still giving the same quantity during the day?

The medicinal power of the sulphate of copper seems to be chiefly determined to the mucous membranes; hence it is exceedingly useful in the chronic diarrhoea of cattle and sheep, the dose not exceeding two drachms

for the former, nor one or two scruples for the latter ; also in nasal gleet, and chronic inflammation of the nasal membrane in the horse. Likewise in cases of long-continued discharge from the nostril after catarrh and fever have ceased, attended by abrasion of the lining membrane, and enlargement of the submaxillary glands, to a certain extent simulating, and by some mistaken for glanders, it has seldom failed to be perfectly successful, being administered in doses of a drachm or more daily.

Externally applied, it is a caustic. In solution it forms a valuable stimulant to foul and indolent ulcers. With alum this may be employed as a styptic to restrain hæmorrhages, and a very weak solution is occasionally injected up the nostrils, or into the frontal or maxillary sinuses, when the lining membrane has taken on diseased action, as an astringent.

A saturated solution is kept in the pharmacy of this institution.

SOLUTIO CUPRI SULPHATIS, *Solution of Sulphate of Copper.*

Take of Sulphate of Copper.....1 part
Hot Water4 parts

Dissolve and filter.

The liniment (for want of a better term) before adverted to is thus made :—

LINIMENTUM CUPRI SULPHATIS, *Liniment of Sulphate of Copper.*

Take of Sulphate of Copper, in powder, 1 part
Treacle4 parts

Place together in a pipkin over a very slow fire, and simmer until the whole assumes a reddish-brown colour. Set aside for use.

Here, by the application of heat, a portion of the salt undergoes decomposition. Its water of crystallization is first driven off, then its acid, and the oxide of copper imparts its colour to the compound. A simple mixture of the two is equally as good, but custom appears to demand the colour. This may otherwise be communicated, and thus much labour be spared. Care should be taken that no iron utensils are employed, since they will cause a precipitation of the copper in a metallic form. This will apply in all instances where sulphate of copper is used and moisture present.

This compound is employed as a detergent in phagadenic ulcerations, particularly of the sensitive parts of the foot, as canker, severe thrush, &c.

DIGITALIS PURPUREA, Purple Foxglove.

This is an indigenous biennial plant, found growing in most of the counties of England, in sandy and gravelly soils on elevated banks and hedgerows; sending up from a cluster of rich green leaves a flowering stalk three or four feet in height, which is terminated by a spike of purple flowers, the form of which has given to the plant its name, *digitalis*, being derived from the German for "finger-hut." The English name foxglove is a corruption of folks'-glove. Those plants which grow wild and exposed to the sun are to be preferred, and such whose flowers are of a deep purple colour. The leaves, which are the parts medically employed, should be collected in the second year, just as the flowers are about to open, and those should be chosen which are fresh and perfect. The mid-rib being removed, the remaining part of the leaf is to be quickly and carefully dried either in a darkened room, or exposed to the sun, or on a tin dish before the fire. It may then be powdered or not; but it should be kept in opaque bottles for use, since by exposure to the air it loses much of its activity.

Composition.—Extractive and resinous matter, in which is found a vegetable alkaloid, digitaline the active principle; ammonia and some earthy carbonates, and other salts.

Properties and Uses.—The leaves of *digitalis*,

when fresh gathered, have but little smell; but by drying they acquire a narcotic odour. They have, when properly dried, this peculiar odour, a fine fresh green colour, and a bitter taste. The state in which this drug is employed by many veterinarians is highly discreditable. I have known it to be given after it has been kept in a drawer for several years, and when it has become nearly colourless. As it is an agent of much value, and can be cheaply got and prepared, none should be used after it is twelve months old.

I am inclined to place *digitalis* amongst the class narcotics; agents which first excite and then depress the action of the heart, although the state of excitation is oftentimes unobserved. It may be given in doses of from 20 to 40 grains in the form of ball, and this may be repeated during the day. It has been given in much larger doses, but I prefer the repetition of small quantities. When long exhibited, and in doses of from 3j to 3ij, it acts on the kidneys; but as a diuretic it can be well dispensed with. Believing its first influence to be that of a stimulant, I should hesitate to give it during the existence of acute inflammatory action. After, however, the lancet has been freely used, or the bowels have been acted upon, it may be safely and advantageously employed. It retards the velocity of the pulse, and frequently causes an intermittency of it, which is a favourable indication that the heart is under our control; and then the medicine should be

either withheld or administered in less quantities. I have not found this intermittency of the pulse an invariable concomitant, except when the system has been lowered by depletion or evacuants of some kind; but I have noticed that digitalis otherwise diminishes the number of the pulsations within the minute. Its use is advocated in pneumonia, hydrothorax, carditis, and many other diseases in which the action of the heart is inordinate; also in chronic coughs. For this last it is often beneficially combined with small doses of aloes.

FERRUM, *Iron.*

The ores of this metal are very abundant, being found in every part of the globe, either in veins or associated with those of other metals. Even entire mountains are sometimes formed of iron ore.

Native iron is rare, and is either terrestrial or meteoric. Iron pyrites, or the sulphuret of iron and clay-iron stone, are the compounds of this metal most interesting to us. From the latter the English iron is principally obtained. In it the metal exists in a state of oxide, in order to reduce which the ore is broken into small pieces, and roasted, so as to drive off any extraneous matters. It is then mixed with limestone and coke, and exposed to a strong heat in a blast furnace, when the lime combines with the alumina and silica, forming a species of glass; while the carbon of the coke unites with the oxygen of the oxide, and is

dissipated in the form of carbonic acid gas, leaving the metal free, and in a liquid state, which is then run into large ingots, constituting what is called crude or cast iron. This is again fused with charcoal; and when it assumes the consistence of paste, it is pressed between rollers, so as to force out the remaining impurities, or it is struck repeatedly with a forge hammer: in this state it is denominated malleable, forged, or bar iron.

The general characters of iron are familiar to most persons. It has a greyish colour and crystalline fracture; is malleable and ductile; not very easily fused, but possesses the property of welding to a remarkable degree, and is capable of receiving a very high polish. Its affinity for oxygen is great; hence it soon tarnishes. Its specific gravity is 7.7. Its atomic weight, 28.

Few of the compounds of iron are employed in veterinary practice. As these are all very valuable tonics, perhaps their number may be increased with advantage. Only one is used at this establishment.

FERRI SULPHAS, *Sulphate of Iron*. Old Names:
Salt of Steel, Green Copperas, Vitriolated Iron.

The College of Physicians gives the following for the preparation of this salt:—

Take of Iron Filings.....	8 ounces
Sulphuric Acid.....	14 ounces
Water.....	4 pints

The sulphuric acid and water being mixed together, to these add the iron, and when bubbles of gas cease to escape, filter through paper and evaporate, so that crystals may form.

Decomposition.—Before the acid can act upon the iron, it must be oxidized: this is effected at the expense of the water, which being resolved into its constituents hydrogen and oxygen, the former escapes in the form of gas, and the latter combines with the metal. This oxide is now dissolved by the sulphuric acid, and by evaporation and crystallization the sulphate of iron is obtained.

<i>Materials.</i>		<i>Products.</i>
9 Water ...	{ Hydrogen...1	1 Hydrogen.
	{ Oxygen.....8	
28 Iron.....	28	76 Sulphate of Iron.
40 Sulphuric Acid	40	

The water is in excess for two purposes, that it may dissolve the sulphate as formed, and afford water of crystallization, to which the crystals owe their hardness and beauty.

<i>Composition.</i> —1 equivalent protoxide of iron = 36	
1	sulphuric acid... = 40
7	water = 63
Equivalent.....139	

Properties and Uses.—Sulphate of iron has a

bluish-green colour, but by exposure to air it becomes wholly green, arising from the absorption of oxygen, which converts the protoxide into the peroxide. The form of the crystal is that of a rhomboidal prism. It has a strong styptic taste, and is soluble in two parts of cold water, and less than its own weight of boiling water.

In commerce there is a compound known by the name of green vitriol or copperas, which is much employed in the arts. This is made by exposing the roasted native sulphuret of iron to the influence of air and moisture, when a crust of sulphate of iron is formed on the surface; the metal being converted into an oxide, and the sulphur into sulphuric acid, by attracting oxygen. By solution and evaporation crystals are obtained; this, by re-solution, filtration, and crystallization, will afford a salt sufficiently pure for the use of the veterinarian.

Sulphate of iron is an astringent and tonic, the dose of which is from $\mathfrak{z}\text{ij}$ to $\mathfrak{z}\text{iv}$.

It is incompatible with every salt whose base forms an insoluble compound with sulphuric acid, with the alkalies and their carbonates, the earths, nitrate of potassa, and the soaps. The form for another tonic mass of the College is as follows:—

Take of Sulphate of Iron, in powder...4 oz.

Ginger Root, do.4 oz.

Common Mass10 oz.

Beat together, so as to form a mass. Dose from 8 to 12 drachms.

FOMENTUM, a *Fomentation*.

The simplest and best fomentation consists of a flannel dipped into hot water, wrung out, and immediately applied to the inflamed part, and frequently renewed.

The value of fomentations is appreciated by most practitioners ; but, in order to obtain the greatest good from them, they should not be occasionally, but continually employed ; that is to say, the flannel should never be allowed to get cold, for then reaction is set up in the vessels of the part. When judiciously applied, they relax the capillary vessels, causing them to pour out a portion of their contents, thus relieving the tension of the integument, and acting almost as a local depletent, whilst the relief thus afforded is often communicated to deeper-seated parts. Their use is indicated during the formation of abscesses or of tumours, and after contusions and sprains. Many practitioners, finding their orders seldom attended to, namely, to keep the flannel always warm, have recourse to poultices in preference ; but even here a watchful eye is requisite ; for if the poultice is allowed to get dry, much irritation will be created by it. The many herbs which were once recommended are now, by common consent,

discarded, as tending rather to check than to augment the benefit derivable from fomentations.

GENTIANA RADIX, *Gentian Root*.

The plant affording this medicinal root is a perennial, a native of the Alps and mountainous parts of Germany, and it is also found in North America. It appears not to yield roots of any value until it is four years old. Gentian root is imported into this country from Germany in large bags.

Composition.—The valuable qualities of this drug are concentrated in a principle denominated, by the continental chemists, gentianine; besides which there are found gum, sugar, colouring matter, a fleeting odorous matter, fixed oil, a substance resembling bird-lime, and woody fibre.

Properties and Uses.—The form of the root is cylindrical, varying in size and length; those are to be preferred which are flexible and covered with a light-coloured wrinkled cuticle. When worm-eaten, they should be rejected. Gentian has an intensely bitter taste, with but little odour. Water and alcohol extract its virtues; a mixture of the two (proof spirit) is therefore the best menstruum. An extract is made by boiling the root in water, straining the decoction, and evaporating until it is of a fit consistence. Should the powder be employed, the root must be carefully dried in an oven before it can be pulverized.

The dose of gentian root is from $\mathfrak{z}\text{ij}$ to $\mathfrak{z}\text{iv}$; of the extract, from $\mathfrak{z}\text{ss}$ to $\mathfrak{z}\text{j}$ may be given twice a-day. Its action is tonic, stomachic, and antiseptic. As a vegetable bitter, gentian is perhaps the best that can be employed in veterinary practice. In those states of the system when the stomach will not bear the mineral tonics, it may be advantageously given. There is likewise another advantage which it possesses: it is without that astringency which characterizes many of the vegetable bitters; hence the salts of iron do not cause any decomposition; and the good derived from the combination of bitters with chalybeates is well known. If any adjunct beyond this be called for, a carminative, such as ginger, may be added. Gentian, with chamomile, appears to me to include all that need be used. It would be easy to swell the list, and add cinchona bark, calumba root, quassia, and others. If I were compelled to add one more, it would be the sulphate of quinine, which may be given in doses of from $\mathfrak{z}\text{j}$ to $\mathfrak{z}\text{ij}$ with decided benefit, as I have witnessed more than once. Its expensiveness may be thought to preclude its general use.

HELLEBORUS NIGER, *Black Hellebore*.

This plant, so named from the colour of its root, has found a place in our gardens, being cultivated for the sake of its flower, which, appearing about Christmas, has received the name of the Christmas rose. It

is, however, a native of Austria, of Italy, and grows wild on the Apennines.

The root, which is perennial, consists of a short thick stump, sending off many small round fibres, about the thickness of a straw, which on drying become corrugated. Externally they are of a brown black colour; internally, of a yellowish white.

Composition.—According to Feneulle and Capron, a volatile oil; concrete oil, resembling fat; resin, wax, volatile acid, bitter principle, mucus, alumina, gallate of potass and lime, and a salt with an ammoniacal base.

Properties and Uses.—This root, as before remarked, is considered by some as being the purgative hellebore of the ancients. This property was discovered by Melampus, who observed that the goats who fed on the plant were purged by it. The daughters of Prætus, King of Argos, were at that time affected with melancholy, and were wandering in the woods, fancying themselves cows. He gave some of this root to them, and they were presently cured; and he received the hand of one of them in marriage, with a part of the kingdom of Argos as his fee.

In veterinary medicine, black hellebore root is only used as a local applicant, its action being that of a stimulant and digestive.

For cattle it has been a long time employed, introduced as a seton into the dewlap. For a knowledge

of its usefulness to the horse I am indebted to Mr. E. Stanley, of Banbury, who employs it in fistulous affections of the pole and withers, and, as he informs me, with almost uniform success. His course of procedure is this :—the abscess having formed, and exit being given to the imprisoned fluid, it is allowed to discharge itself for two or three days, being dressed merely with an ordinary digestive. When the pus assumes a laudable character, he introduces a few portions of the fibrous part of the root, passing them down to the bottom of the sinuses, and letting them remain for a fortnight or more ; in the meantime, merely keeping the surrounding parts clean. On examination it will be found that the healing process has commenced where it is desirable that it should, and a fresh introduction of more of the root is called for : this is repeated until a cure is effected. Having myself seen its action in several cases, I can speak somewhat confidently of its power. All that is requisite is to guard against employing it too soon, since death has been the result of the great excitement which it has produced in the system.

An ointment formed by the powder of this root, or that of white hellebore, in the proportion of one part to eight of lard, will be found extremely active for the dressing of rowels or setons, where the milder compounds of turpentine and cantharides are inadmissible.

HYDRARGYRUM, *Mercury* or *Quicksilver*.

This metal is found native, but not in large quantities, it being disseminated in small globules amongst the ores of mercury; the most abundant of which is the sulphuret, from which the mercury of commerce is obtained. This mineral occurs massive, in granular concretions, and also crystallized, of a red colour, varying in its shades. It is denominated cinabar. The most productive mines are those of Idria in Carniola, the lower Palatinate, Almaden near Cordova in Spain, and Guanán Cavelica in Peru, where the sulphuret exists in an enormous mass fifty yards in width, and it has been worked to the depth of 500 yards. Other mines exist in Germany, Hungary, and New Spain.

The method by which the metal is obtained from the native sulphuret is this:—The ore being broken into pieces and sorted, is reduced to powder and mixed with one-fourth its weight of quick-lime. This is placed in iron retorts, each of which holds about half a hundred-weight. Many of these are arranged in a furnace together, and glass receivers are fitted to them. Heat being applied, some watery vapour is first disengaged; this is allowed to escape, and the receivers are luted on, when the mercury passes over and is condensed in them; the sulphur in the meantime, combines with the lime, forming a sulphuret of

lime, which remains in the retort. Instead of lime, iron filings are sometimes employed. By this process one hundred pounds of the ore yield from six to ten ounces of mercury. It is the one usually adopted in Germany, whence the market is largely supplied. Quicksilver is imported either in leather skins or cast-iron bottles, containing from sixty to a hundred pounds weight.

Mercury has the singular property of being liquid at the ordinary temperatures of our atmosphere; but at 39° below 0 Fah. it becomes solid; and at 660° Fah. it boils rapidly, and may be distilled like water. It is inodorous, insipid, and of a bright white or silver colour. Its specific gravity is 13.6; its atomic weight, 202. When pure it is extremely mobile; and if thrown upon a level surface in small portions, it readily divides into minute round globules. This is one test of its purity, for it is frequently adulterated by the admixture of other metals, particularly lead, tin, zinc, and bismuth. When this is the case, not only does it lose its mobility and bright metallic appearance, but, when divided, the globules have an irregular form, being sometimes tailed. Also, when exposed to the air, a film collects on its surface. It likewise tarnishes glass bottles, in which it is kept. The means of purification are by distillation with iron filings, or by agitation in dilute sulphuric acid.

Mercury, in its metallic state, has no action on the

animal system. Its compounds, however, are very energetic, being general and powerful excitants to glandular structures.

HYDRARGYRI BICHLORIDUM, *Bichloride of Mercury*. Old Names: Corrosive Sublimate, Oxymuriate of Mercury

To prepare this compound, the College thus directs:—

Take of Purified Mercury, by weight, 2 pounds
Sulphuric Acid, do.....3 pounds
Chloride of Sodium1½ pound

Boil the mercury with the sulphuric acid in a glass vessel, until the bipersulphate of mercury becomes dry; rub this, when cold, with the salt in an earthen mortar, and sublime with a heat gradually raised.

Decomposition.—At low temperatures no change is effected by sulphuric acid, but at the boiling point a portion of the acid becomes decomposed, and is resolved into oxygen, which converts the metal into an oxide, and sulphurous acid gas; this is emitted with effervescence, while the remaining undecomposed acid acts upon the oxide, and forms a bisulphate of the peroxide of mercury: to this common salt being added, and heat applied, the chlorine of the salt goes to the mercury, changing it into a bichloride, which sublimes, whilst the oxygen of the oxide of mercury, uniting

with the sodium, forms soda ; and this being dissolved by the sulphuric acid, forms a sulphate of soda, which remains at the bottom of the subliming vessel.

The following diagrams will assist the explanation, remembering that four equivalents of acid are employed with one of mercury, and two of the chloride of sodium.

To form the Bipersulphate of Mercury.

<i>Materials.</i>		<i>Products.</i>
40 Sulph. Acid	{ Sulphurous Acid 32	32 Sulphurous Acid Gas
	{ Oxygen..... 8	
40 Sulph. Acid	{ Sulphurous Acid 32	32 Sulphurous Acid Gas
	{ Oxygen..... 8	
40 Sulph. Acid	40	
40 Sulph. Acid	40	
202 Mercury	202	298 Bipersulph. of Merc.

To form the Bichloride of Mercury.

<i>Materials.</i>		<i>Products.</i>
298 Bisulphate of Mercury	{ Mercury ... 202	274 Bichloride of Mercury
	{ Oxygen 8	
	{ Sulph. Acid 40	
	{ Oxygen 8	
120 Chloride of Sodium	{ Sulph. Acid 40	
	{ Chlorine ... 36	
	{ Chlorine ... 36	
	{ Sodium..... 24	72 Sulphate of Soda
	{ Sodium..... 24	72 Sulphate of Soda

<i>Composition.</i> —1 equivalent mercury.....	202
2 chlorine	72
Equivalent.....	274

It usually occurs in a mass made up of small acicular crystals. If, however, care be taken in its preparation, these are larger, and in form tetrahedral. They effloresce on the surface by exposure to air. Specific gravity 5.1398 ; taste disagreeable and metallic. Soluble in twenty parts of water at 60°, and in about three parts at 212°. This is increased by the addition of hydrochloric acid, hydrochlorate of ammonia, and common salt.

Properties and Uses.—Internally the bichloride of mercury is rarely administered. Externally applied, it is an active caustic, and is much extolled by the older practitioners for its causing an extensive slough ; hence it is used by them in sinuous wounds, and where it is desirable to expose a new surface. The form is either that of solution, or introduced into the wound in tubes made of paper, where it soon undergoes solution, and causing action, creates much surrounding irritation. This Institution long gave a form for a solution to be made thus :—

Liquor Hydrargyri Bichloridi.

Take of Bichloride of Mercury1 part
 Hydrochloric Acid.....1 part
 Rectified Spirits of Wine, or Water, 7 parts
 Dissolve.

This was injected into fistulous sores; but of late years it has been discarded, and milder remedies are employed with equal success.

Mr. C. Dawson has recommended a solution of this salt for the purpose of coagulating the synovia as it escapes from open joints; and his account of its action, in the pages of "The Veterinarian," is highly favourable.

A solution of the bichloride of mercury, in the proportion of ten grains to an ounce of water, the salt being first rubbed down with a few drops of spirit of wine, is an effective and safe application for the mange in dogs, and to destroy lice. At this degree of strength it is a most valuable lotion for mange in cattle, but many a beast has been destroyed when it has much exceeded this.

HYDRARGYRI CHLORIDUM, *Chloride or Protochloride of Mercury*. Old Names: Calomel, Submuriate of Mercury.

The College of Physicians directs it to be made thus:—

Take of Purified Mercury, by weight...4 pounds
Sulphuric Acid, by weight.....3 pounds
Chloride of Sodium.....1½ pound
Distilled Water, as much as may be sufficient.

Boil two pounds of the mercury with the sulphuric acid in a glass vessel until the bipersulphate of mer-

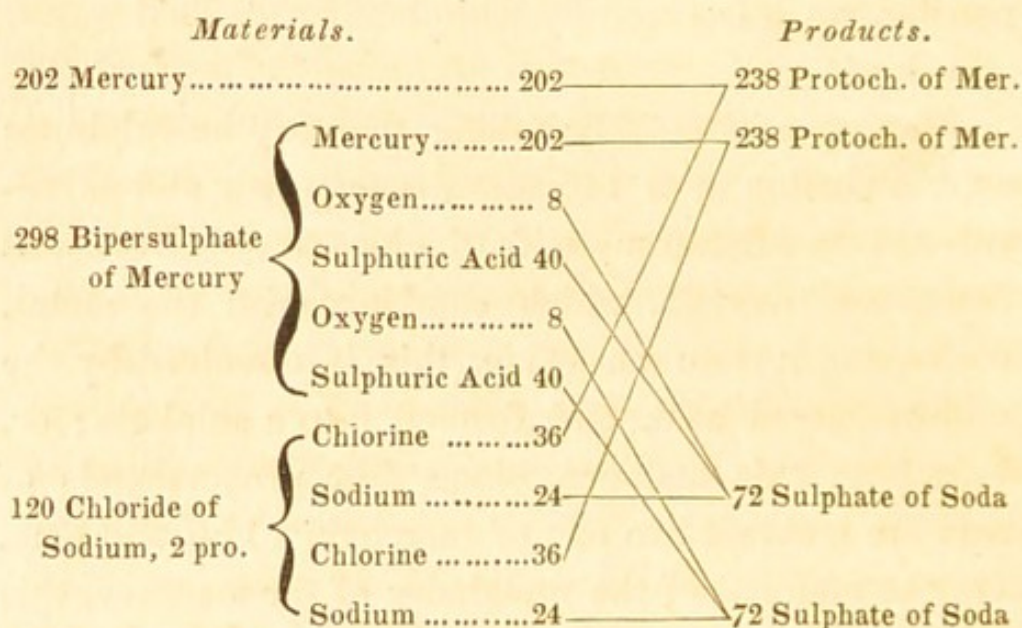
cury is dry. When this is cold, triturate it with the remaining two pounds of mercury in an earthen mortar, so that they may be thoroughly mixed; then add the chloride of sodium, and rub them together until globules of mercury are no longer visible; afterwards sublime. Reduce the sublimed matter to a very fine powder, wash it carefully with boiling distilled water, and dry it.

Decomposition.—By boiling mercury in sulphuric acid, a portion of it becomes decomposed, and is resolved into sulphurous acid, which escapes in a gaseous form, and oxygen, which combines with the metal, converting it into an oxide, this is dissolved by the undecomposed acid, and formed into a sulphate; or, as it is in this instance, since four proportionals of acid are employed to one of mercury, a bipersulphate. On the addition of the remainder of the mercury, this is changed into a protosulphate. When this is sublimed with the chloride of sodium, a double decomposition takes place. The oxygen of the sulphate combines with the sodium, forming soda, which the sulphuric acid converts into sulphate of soda, and which remains at the bottom of the subliming vessel, whilst the liberated chlorine unites with the vaporized mercury, and these, rising into the head of the vessel, are condensed in the form of protochloride of mercury. This is a crystalline compound, and is therefore directed to be pulverized, and subsequently to be washed.

A diagram may serve to render the changes more clear.

To prepare the bipersulphate of mercury, the diagram under the head of bichloride of mercury will suffice.

To prepare the Protochloride of Mercury.



Composition.—1 equivalent mercury.....202

1 chlorine 36

Equivalent.....238

Protochloride of mercury, or calomel, is in the shops in the form of an impalpable powder, of an ivory-white colour, which deepens by exposure to light. It is inodorous, insipid, and nearly insoluble in water. A solution of lime renders it black, a circumstance which affords a test for its purity, since if any corrosive

sublimate be present, it is indicated by a yellow tint being mingled with the black. The alkalies effect the same change as lime, throwing down the protoxide of mercury. It is also decomposed by sulphuretted hydrogen, and by the hydrosulphurets of antimony, iron, lead, and copper, and by soap ; hence with all these it is incompatible.

Calomel may be regarded as one of the most useful of the preparations of mercury. It is a general excitant to glandular structures, and is therefore combined with various therapeutics. As a purgative alone, administered to the horse, it is an unsafe one. It is useful, however, as an adjunct to other cathartics, and is employed at the College in order to effect an expulsion of worms from the intestinal canal, being given in doses of from ʒj to ʒij over night, and the following morning an aloetic purge is administered. By this means large quantities are often expelled. Multifarious are the recipes for the eradication of these parasites, the vegetable and the mineral kingdoms having been ransacked for agents ; but it has been very aptly remarked by Mr. B. Clark, “although we can force a poison down the horse’s throat, we cannot force the worms to receive it.” In hepatic affections, calomel has been found of the greatest service. In repeated small doses it will produce ptyalism, an effect which I have witnessed several times. Mr. C. Spooner has employed the protoxide in combination with lime

in solution, constituting "black wash," with benefit in sluggish and ill-conditioned ulcers. This is readily made by adding two or more drachms of calomel to a pint of lime-water. If a more active compound be required, the bichloride of mercury may be substituted for the protochloride, forming the hydrated binoxide.

UNGUENTUM HYDRARGYRI, *Mercurial Ointment*.

Take of Purified Mercury,

Prepared Lard, of each equal parts

Let the mercury be rubbed with a portion of the lard till its globules become extinct ; then add the remainder, and intimately mix.

This compound should always be prepared by the practitioner : it requires, however, labour and patience. As ordinarily prepared, during trituration a portion of the metal becomes oxidized, and the remainder is minutely subdivided, which will again run together into globules, if heat be applied. To facilitate the disappearance of the metallic mercury, various substances are employed ; the best is rancid lard, or some mercurial ointment which has been long kept. As it is desirable that the whole of the mercury should be oxidized, it has been proposed to combine the oxide of mercury with the lard by simple mixture. This plan, however, has not come into general use, although the compound formed has been found quite equal to the officinal preparation.

Mercurial ointment is occasionally employed in skin affections, as tetter or ringworm, and also in mange, but then it should be diluted as follows, and its action carefully watched. I have more than once seen ptyalism produced by its incautious use, and dysentery and death ; but in the hands of the scientific man there is nothing to be apprehended.

UNGUENTUM HYDRARGYRI COMPOSITUM, *Compound Mercurial Ointment.*

Take of Mercurial Ointment.....1 part

Soft Soap2 parts

Mix them.

UNGUENTUM HYDRARGYRI NITRATIS, *Ointment of the Nitrate of Quicksilver.*

Take of Purified Mercury.....1 part

Nitric Acid2 parts

Poppy Oil10 parts

Prepared Lard.....2 parts

Dissolve the mercury in the acid, carefully avoiding the fumes which are given off, and, whilst hot, pour the solution into the lard and oil, previously melted together. Stir constantly until cold with a wooden spatula.

Decomposition.—A portion of the nitric acid becomes decomposed, nitrous acid fumes are evolved, and the oxygen oxidizes the metal, which oxide is dissolved by the remaining undecomposed acid.

When carefully prepared, this ointment is of a pale and delicate yellow colour ; and as it is usually made, it is very apt to get brittle, arising from the excess of acid acting upon the fatty matters ; to obviate which it has been proposed to form a nitrate of mercury first, and then mechanically combine it with lard. The excess of acid, however, appears to be advantageous, the compound being used, in veterinary practice, as a detergent and an excitant to certain diseases of the skin, such as chronic grease, ringworm, and those affections vulgarly called mallenders and sel-landers, names which, long ere this, should have been buried in oblivion. I have substituted poppy oil for that of olives, and find that, although the colour of the compound is not so delicate, its consistence is much improved, and it is retained for a longer time.

A milder form of ointment has been found of service in tarsal ophthalmia. This is best made extemporaneously, by mixing together one part of the stronger ointment with two parts of lard and oil. An efficient liniment may be formed by adding the solution of the nitrate of mercury to poppy oil alone, triturating together until they incorporate.

IODINUM, *Iodine*.

Iodine and its compounds have not yet come into general use amongst veterinarians ; I have little doubt, however, but that they will. Iodine is obtained from

the mother water, after the procurement of carbonate of soda from sea-weeds. The available compound which remains is an hydriodate of soda: sulphuric acid being poured on this, it seizes on the soda, setting the hydriodic acid free. This is held in solution, and to every twelve ounces are now added 1000 grains of the peroxide of manganese, and the whole is placed in an alembic. On the application of heat, iodine, water, and the hydriodate of manganese, are the result of the mutual re-action of two equivalents of this acid and one of the peroxide of manganese.

<i>Materials.</i>	<i>Constituents.</i>	<i>Products.</i>
127 Hydriodic Acid	{ Iodine.....126 { Hydrogen1	Iodine126 Water9
127 Hydriodic Acid127		
44 Peroxide of Mang.	{ Oxygen8 { Prot. of Mang. 36	Hydriod. of Mang. 163

Properties and Uses.—Iodine is solid at the ordinary temperature of the air, and occurs in dark coloured scales, which have a metallic lustre: when sublimed, it forms rich violet-coloured vapours, hence the name given to this substance. It has a pungent odour, an acrid taste, and it tinges the skin of a brownish-yellow colour. Weight of its atom, 126. Its action is that of a stimulant to glandular structures, and the forms in which it is employed externally are those of a liniment and ointment.

LINIMENTUM IODINII COMPOSITUM, *Compound
Liniment of Iodine.*

Take of Iodine.....1 part

Soap Liniment8 parts

Dissolve.

UNGUENTUM IODINII, *Ointment of Iodine.*

Take of Iodine1 part

Lard.....8 parts

Mix. Some substitute for lard the milder ointment of mercury, by which a far more active compound is formed. Others add half a part of cantharides in powder, or tartar emetic.

Administered internally, the form of tincture is advocated.

TINCTURA IODINII, *Tincture of Iodine.*

Take of Iodine1 part

Rectified Spirit.....8 parts

Dissolve.

The dose of this is from ʒj to ʒij, given twice or thrice a-day. In the practice of Mr. Packwood, of Coventry, farcy has yielded to it.

Preference, however, appears to be given by most practitioners to the compound now to be noticed.

POTASSII IODIDUM, *Iodide of Potassium.*

Disolved in water, this becomes an hydriodate of potassa.

If a solution of potassa be poured upon iodine, there are produced an iodate and an hydriodate of potassa, the latter of which may be separated from the former by means of rectified spirit, and the salt may be obtained pure by evaporation. This simple form of Majendie has given place to a more complex one, that of forming an hydriodate of iron and decomposing it by carbonate of potassa. For this purpose, 124 grains of iodine, and 50 or 60 grains of iron (this in excess being an advantage), may be mixed with two or three ounces of water in a Florence flask, and heat applied by means of a lamp until the liquid becomes clear. The solution of the hydriodate of iron being filtered, to it is added a solution of the carbonate of potassa, taking care that no more is added than is exactly necessary to decompose it: carbonate of iron is precipitated, and hydriodate of potassa remains in solution. When this is evaporated, and the compound obtained in crystals, it is an iodide of potassium.

The *decompositions* which take place will, by the following diagrams, be more easily understood.

<i>Materials. Constituents.</i>		<i>Products.</i>	
126 Iodine	126	127 Hydriodic Acid	} Hydriodate of Iron = 163
9 Water {	Hydrogen 1		
	Oxygen ...8		
28 Iron	28	36 Oxide of Iron	

<i>Materials.</i>	<i>Constituents.</i>	<i>Products.</i>
163 Hydriodate of Iron	Iodine126	Iodide of Potassium = 166
	Hydrogen1	Water = 9
	Oxide of Iron 36	
70 Carbonate of Potassa	Potassium ...40	
	Oxygen8	
	Carbonic Acid 22	Carbonate of Iron..... = 58

Composition.—1 equivalent iodine = 126

1 potassium = 40

Equivalent.....166

Mr. Youatt and Mr. Karkeek both speak highly of the iodide of potassium. The dose may be from 20 to 30 grains.

It does not appear to accumulate in the system, like iodine, the kidneys being the emunctories by which it is ejected; and it is easily detected in the urine, after it has been administered but for a short time. It is also more certain in its action. As a topical remedy, the form of ointment is preferred.

UNGUENTUM POTASSII IODIDI, *Ointment of Iodide of Potassium.*

Take of Iodide of Potassium1 part

Lard.....8 parts

Mix.

The action of iodine and its compounds is most

markedly seen in glandular structures and newly-formed parts, for which they would seem to manifest a preference. Their influence is on the absorbents, and through them, when these agents have been long and injudiciously given, it is recorded that even the mammæ of women and the testes of men have been removed. In chronic enlargements of the submaxillary, parotid, mammary, and other glands, in tumours of long standing, for thickening of the integuments, and indurated swellings about the joints, and even for unhealthy ulcerated surfaces, the use of the compounds of iodine is indicated, combining both their internal and external employment. Unfortunately, it is too often the case, that, if the sanguine expectations of the practitioner be not at once realized, the agent is discarded as useless. Now, these agents rank amongst those whose operation is slow, but which, at the same time, constitute an important class, as their effects are abiding.

LINUM USITATISSIMUM, *Common Flax.*

The flax plant originally came from the banks of the Nile, where it flourishes luxuriantly. It is in this country largely cultivated for the sake of its ligneous principle, which is manufactured into linen; but by far the greater quantity of the seeds used is imported from the Baltic. They are contained in a globular pointed capsule, which is divided into five valvular

cells; they are solitary, of a brown colour externally, glossy, and of a flattish oval shape, abounding with mucus, which resides in the testa, and a fixed oil united with the parenchyma.

Composition.—Farina, mucus, fixed oil.

LINI OLEUM, *Linseed Oil.*

By expression, linseeds yield one-sixth of their weight of a fixed oil. This, when cold drawn, has a greenish colour, is pale, limpid, and brilliant, and has a mild soft taste. Generally, however, heat is employed, when it is less pure, it then having a yellow colour, a strong odour, and a disagreeable flavour.

It is employed as a cathartic, in doses of from one to two pints; and, according to the testimony of Mr. Percivall, it is more certain and safe in its effects than castor or olive oil. Its activity may be increased by the addition of a few drops of the oil of croton. A liniment formed by its combination with lime-water has been found of benefit in cases of burns.

LINI FARINA, *Linseed Meal.*

After the linseeds have been expressed, there remains behind a cake, which is much employed for fattening of cattle. It consists of mucus and farinaceous matter. When ground, it constitutes the linseed meal of the shops. It is used as an emollient poultice, or for the purpose of giving bulk to other medicines.

A far preferable agent is the ground or crushed unexpressed seeds. A little caution is here requisite, that the unwary practitioner is not imposed upon by a mere mechanical mixture of linseed oil with meal. A bare inspection will suffice for the detection. I am indebted to Mr. Cherry, jun., for a simple form for a very useful mass, in which other materials may be exhibited. I have designated it

Common Mass.

Take of Linseed, finely ground,
Treacle, of each, equal parts.

Mix together with the hand, or otherwise, so as to form a mass. This will be soft at first, but it will soon acquire tenacity, which it will retain for a long time.

LINI INFUSUM, *Infusion of Linseeds.*

As the mucus resides in the outer covering of the seeds, all that is necessary for its abstraction is to pour boiling water over them, in the proportion of one pint of water to one ounce of the seeds, and let it remain until cold, when a viscid solution will be obtained, which is used as a vehicle for exhibiting, in a state of suspension, insoluble powders, and extolled as a demulcent in catarrhal affections. By boiling of the seeds, the decoction contains, besides the mucus, a portion of oil, which renders it less grateful to the palate.

MAGNESIÆ SULPHAS, *Sulphate of Magnesia.*

The name Epsom salts has been given to this compound, from its having been found to exist in the waters of a spring at Epsom, in Surrey. A large quantity of it used to be procured from the bittern which remains after common salt had been obtained from sea-water; but as this contained some muriate of magnesia, which is a deliquescent salt, the compound was commonly damp. This is now obviated by preparing it from the magnesian lime-stone, according to a process invented by Dr. Henry. The mineral is calcined, to expel the carbonic acid; then treated with diluted muriatic acid, to take up the lime; and to the precipitated magnesia is added sulphuric acid, so as to form a sulphate of magnesia.

<i>Composition.</i> —1 equivalent magnesia ...		= 20
1	sulphuric acid	= 40
7	water	= 63
		—
Equivalent.....		123

Properties and Uses.—Sulphate of magnesia crystallizes irregularly, either in six-sided or quadrangular prisms or acicular; its taste is bitter and unpleasant; it is soluble in its own weight of water at 60°, and in three-fourths of its weight of boiling water. It is chiefly employed as a purgative for cattle and sheep, and with these animals almost supersedes every other

aperient drug. According to Thomson, the benefit resulting from it arises from its causing an augmentation of the discharge from the biliary and pancreatic ducts, which excites the intestines into increased action.

MYRRHA, *Myrrh*.

This is a gum resin, an exudation from a species of *Balsamodendron*, a native of Arabia, where it forms stunted groves, intermingled with the acacia, of which it was once thought to be the produce. At first it is oleaginous, but soon thickens on exposure to the air, becoming opalescent and of a whitish-yellow colour, which, when hardened, changes to a reddish-yellow. It is imported into the market from the East Indies in chests, containing from three to four hundred-weight.

Composition.—Resin and essential oil.....34.68
Gum and extractive.....65.32

100

Properties and Uses.—Myrrh is frequently mixed with other gums, and much extraneous matter. It may be distinguished by its irregular form and fragrant odour, arising from the presence of a volatile oil, which is best seen on pressing a broken piece with the nail. Those pieces should be chosen which are opaque, light-coloured, and free from dirt. It is soluble in a mixture of alcohol and water; but if the quantity

taken up be large, on the addition of more water, a turbidity ensues. The alkalies increase its solubility.

Myrrh is a stimulating tonic, and an antiseptic. It is not commonly given internally to the horse, although it has been advocated in chronic coughs, in doses of from $\mathfrak{z}\text{ij}$ to $\mathfrak{z}\text{iv}$, combined with opium. To cattle it is frequently given in doses of from $\mathfrak{z}\text{ss}$ to $\mathfrak{z}\text{j}$. Externally, the spirituous solution is employed as an excitant to indolent and vitiated ulcers, and as a general stimulant to wounds. It corrects the foetid discharge, and induces healthy granulations to be thrown out. The form is that of a compound tincture, which is given under the article ALOES. When first applied, it proves a powerful stimulant, from the spirit; this soon evaporates, leaving a gummy resinous coating behind, by which the wound is protected, and the stimulating action maintained.

The simple tincture of myrrh is an excellent application to ulcers of the gums and canker in the mouth, in all our domesticated animals.

TINCTURA MYRRHÆ, *Tincture of Myrrh.*

Take of Myrrh, bruised3 ounces

Rectified Spirit2 pints

Macerate for fourteen days, and strain.

OLIVÆ OLEUM, *Olive Oil.*

This is a fixed oil, obtained by expression from the

fruit of the olive tree, which is now ranked amongst the plants indigenous to the south of Europe, although it is supposed to be a native of Asia. It is cultivated abundantly in the Greek islands, France, Spain, and Italy.

The fruit, which is an oval plum, is gathered when it is fully ripe, being then of a violet colour, and crushed in a mill, the stones of which are set wide apart, so that they may not break the kernel. The pulp is then put in bags made of rushes, and subjected to gentle pressure, when it yields a quantity of bland scentless oil. This is the finest; hence it has been designated virgin oil. A second sort is got by fermenting the bruised mass, and again subjecting it to pressure; but that which is commonly sold as second oil in the shops is olive oil two years old. It comes into this country from Lucca and Florence, in jars and flasks.

Properties and Uses.—Olive oil can be viewed by the veterinarian, only as a demulcent and emollient, for, as a laxative, it is very mild and even uncertain in its action. Its colour should be a pale yellow, odour and taste none, but soft and agreeable in the mouth. It is the lightest of all the fixed oils. Specific gravity, .915. Boils at 600°, or rather at this temperature undergoes decomposition, and congeals at 38° F., which last is a test of its purity. It is commonly used as a vehicle for more active substances, particularly in the formation of liniments, and some ointments. For ordinary purposes,

commoner oils may be substituted, as that of the spermaceti whale, or rape-oil, procured by expressing the seeds of the wild turnip.

OPIUM, *Opium*.

The inspissated Juice of the Seed-vessels of the White Poppy, *Papaver Somniferum*.

This species of poppy is a native of the southern parts of Asia, where it flowers in February. It has been found growing wild in this country, and is largely cultivated at Mitcham, in Surrey, for the sake of its capsules, which are advocated in medicated fomentations; and its seeds, which yield, on pressure, a bland oil, used in the arts. Here the flowers do not appear till June or July.

All parts of the plant abound with a milky juice; but that from the seed-vessel is alone employed medically. In the East, as in Persia, Turkey, and India, the manner of preparing opium is extremely simple. The capsules or seed-vessels, about a week after the petals have fallen from the stalk, are wounded with a five-edged cutting instrument, both in a transverse and vertical direction, so that the cells containing the juice may be opened. This is done in the evening; and, in the morning, the juice which has flowed out during the night is scraped off by means of a piece of iron, put into an earthen vessel, and evaporated in the sun until of a due consistence. It is afterwards formed

by the hand into masses, and then covered with tobacco or poppy leaves. That which comes from Turkey is usually invested with the reddish capsules of a species of rumex, which is considered to be indicative of its goodness. Opium is imported into this country in chests, and the market is principally supplied from Turkey and India. The first is preferred.

Composition.—No article of the materia medica, perhaps, has so much occupied the attention of chemists as this. Through their labours we have arrived at a knowledge that the activity of this valuable drug depends upon the presence of two principles, a meconate of morphia and narcotine; besides which, there are found in it several of the proximate substances of vegetables, as gum, resin, extractive, volatile oil, woody fibre, caoutchouc, and a brown acid, with some sulphate of lime and potassa.

The alkaloid, morphia, united to its peculiar acid the, meconic gives to opium its soporific properties. To narcotine has been attributed the stimulating effects which are known to take place on the administration of this drug, before its sedative action is manifested. It therefore follows, that, if the one can be separated from the other, a desirable end will be obtained; and this has been effected. By the veterinarian, the opium of commerce is commonly made use of, none of the salts of morphia having been, that I am aware of, employed by him. I have given the acetate of morphia,

but not with any results that would warrant me in recommending it to particular notice.

Properties and Uses.—Opium, when good, is a solid, opaque, tenacious substance, yielding to pressure, and softening in the hand; of a reddish-brown colour, and having a peculiar heavy narcotic odour. When dried and powdered (in which state it should be kept in the pharmacy in closely-stoppered bottles), it has a light fawn colour, and its taste is nauseous and bitter. It should be rejected when it is either very soft, greasy, friable, of a black colour, or mixed with many impurities. It is partly soluble in water, alcohol, æther, wine, vinegar, and lemon-juice. The best solvent is diluted alcohol.

The aqueous solutions of opium redden litmus paper; and precipitates are formed on the addition of ammonia, the carbonates of the fixed alkalies, the solutions of bichloride of mercury, diacetate and acetate of lead, nitrate of silver, and the sulphates of zinc, iron, and copper; also by all astringent vegetable infusions. Hence, with all these opium is incompatible.

In speaking of the uses of this agent, I am compelled to dissent from the opinion held at this Institution respecting it, for, I do believe that it relieves pain in the horse, and from the tranquillity thus afforded, sleep often supervenes.

Opium is an invaluable narcotic and antispasmodic; it also acts indirectly as an astringent. It may be

given in doses of from ʒj to ʒij, in the form of a watery solution, or a spirituous tincture, or of ball,—the two last forms being most desirable when employed as an antispasmodic. The watery solution, or perhaps, more correctly speaking, the mixture, is to be advocated when its narcotic effects are called for. I am acquainted with several practitioners who rely on the aid of this agent after blood-letting, in cases of inflammation of the bowels, and they speak of it in terms of the highest praise. The few cases that have fallen under my notice, in which this drug has been employed, enable me to corroborate their statements. The quantity usually administered is two drachms at first, rubbed down with warm water, so as to form a draught ; and a drachm is given every hour afterwards, until relief is obtained. Occasionally the first dose is blended with oil, although little is to be apprehended from the torpidity of the bowels, which sometimes supervenes, as this can easily be obviated by the exhibition of half a pint or more of linseed oil the following morning. In smaller doses than this, opium has been recommended in chronic coughs, where it affords relief by allaying irritation. As an astringent in cases of superpurgation, a drachm may be thrown up in the form of a clyster, the menstruum being thin starch gruel ; or it may be given in combination with chalk. This may or may not call for repetition.

As an antispasmodic, the spirituous solution or tinc-

ture is generally given in doses of from ℥j to ℥ij. To it is sometimes added a watery solution of aloes, or with it is blended the essential oil of juniper or of turpentine, the proportions of the former being from ℥j to ℥iss, of the latter f℥ij to f℥iv. The tincture is thus formed :—

TINCTURA OPII, *Tincture of Opium.*

Take of Hard Opium, powdered...3 ounces

Proof Spirit2 pints

Macerate for fourteen days, and filter for use.

In addition to this being administered as an anti-spasmodic, a few drops are frequently directed to be poured into the eye in the second stage of ophthalmia, when the inflammatory action is lessened, and yet much suffusion remains. Its influence would appear to be twofold: it induces healthy action, and allays irritation.

All formulæ are inert, in the diarrhœa or dysentery of cattle and sheep, in which opium is not prescribed. On account of the irritable character of the mucous membrane of the stomach of the dog, according to Mr. Youatt, is best administered to that animal in the form of the syrup of white poppies.

PIX ABIETINA, *Burgundy Pitch.*

This is obtained from the spruce fir by incisions being made into its bark during the summer months,

from which a resinous juice tardily flows, and concretes in flakes on exposure to the air. These are removed as they accumulate by an iron instrument; and, being melted in boilers with water, are afterwards pressed through cloths, and poured into casks for exportation. The market appears to be supplied principally from Saxony.

Properties and Uses.—Burgundy pitch is a brittle opaque compound, having a dull yellow colour, and a terebinthinate odour.

It is a stimulant and rubefacient in its action, and, when softened with a little of the oil of turpentine, will form an adhesive plaister, which may be substituted for the “charge” of the farriers.

A fictitious article is made by druggists by melting together common turpentine and resin, and the fraud is not easy of detection. But as all the compounds of turpentine possess nearly the same properties, it is not, perhaps, so much a matter of moment.

PIX LIQUIDA, *Tar.*

This compound is obtained by subjecting billets of the fir woods to smothered combustion. For this purpose, a conical hole is dug in the earth, whence a gutter or channel at its bottom proceeds, connected with a reservoir: the side of a hill is therefore chosen. The cavity being filled, the wood is raised in a conical form above it, and covered with turf. The pile is

kindled at the top, and, combustion going on from above downwards, the wood is converted into charcoal, whilst the terebinthinate vapours and smoke are condensed and forced into the excavation, where they suffer liquefaction, and, flowing out through the channel, are received into casks in the form of common tar. The northern states of Europe largely supply the market, but considerable quantities are now obtained by the destruction of wood for the procurement of pyroligneous acid.

Composition.—Tar is evidently the result of the decomposition of the resinous juices of the wood; but it also contains other vegetable matters. It may be designated a mixture of resin, empyreumatic oil, charcoal, and acetic acid.

Properties and Uses.—Tar is of a brownish-black colour, adhesive, and varying in consistence with the temperature of the air. Thinly spread out, its volatile parts evaporate, and a resinous coating remains behind. Its taste is hot and disagreeable, the smell penetrating, and not objected to by most persons.

It is mostly used as an external applicant, being a rubefacient and excitant. When applied to the skin, it has been found serviceable in mange and other cutaneous affections, having been previously mixed with oil or lard; but the pyroligneous oil of tar has at this Institution obtained the preference.

It is a common remedy for some diseases of the

feet. Thrushes frequently yield to the stimulus imparted by it; whilst mixed with a little grease, and smeared over the wall and sole, it gives elasticity to the horn, and causes an increase of its growth. These effects are to be seen in the plan now very generally adopted, of interposing leather soles between the shoes and feet, filling the interstices with tow saturated with tar.

As a common foot ointment, the following may be employed:—

UNGUENTUM PICIS LIQUIDÆ, *Ointment of Tar.*

Take of Common Tar,

Lard, and Resin, of each equal parts

Melt together, to form an ointment.

PIX NIGRA, *Black Pitch.*

If tar is subjected to distillation, an empyreumatic oil passes over into the receiver, and a resinous mass remains behind, which is pitch; but it is very rarely thus obtained. More commonly it is procured by setting tar on fire, and burning it until of the required consistence, which is known by dipping a stick into it. Three barrels yield about two of pitch. It is also made by boiling together refuse resin and common tar.

Pitch is more adhesive than common tar, and may likewise be designated a rubefacient. Occasionally it

forms the basis of coarse plaisters, but it is not very generally used, except for bandages round the hoof in sandcrack, and occasionally as a charge. The Burgundy pitch, before spoken of, is a preferable agent.

PLUMBUM, *Lead*.

This metal is familiarly known to most persons. Rarely does it occur in the native or pure state, but it is found largely mineralized with sulphur, oxygen, and many acids, forming a great variety of ores.

The native sulphuret is an abundant mineral, and from it the greater quantity of the metal is procured, by the usual processes of washing and reduction. The ore is broken into small pieces, washed in water, and exposed to a strong heat in a furnace, to separate the sulphur; it is then fused with lime, and, the scoria being raked off, the fluid metal is run into moulds, in which state it receives the name of pig lead.

Lead has a bluish-white colour, and much lustre, which, however, it soon loses on exposure to the air, becoming covered with a crust of carbonate. It is insipid, but emits a disagreeable odour when rubbed. It stains the fingers and paper, has a specific gravity of 11.35, and is both soft and flexible. It melts at 610° F., and at high temperatures rapidly combines with oxygen.

In its metallic state, it would seem to exert but little, if any, action on the animal system; but, if ox-

idized or combined with acids, compounds are formed, which prove energetic poisons. Horses and cattle, in the neighbourhood of lead-works, are, by the slow introduction of some of these into the system, either from their drinking the water impregnated with the carbonate, or eating of the herbage on which an oxide may have lodged, very subject to affections of the bowels, accompanied with violent griping pains and constipation (*colica pictonum*), which commonly prove fatal. Active purgatives of the sulphate of magnesia with croton, followed up by opium, are the remedies usually had recourse to. As a preventive, dilute sulphuric acid may be tried, so as to form an insoluble sulphate, which may be expelled by a cathartic. The approach of the disease is indicated by a disordered state of the stomach and a morbid appetite. The animal eats voraciously, and acquires flesh: nothing is refused by him; even masses of lead ore and pieces of brick have been found in the rumen of cattle. This is followed by obstinate constipation of the bowels, and laboured respiration, with other concomitants, which are extremely difficult to combat.

Officinal Preparations.—Plumbi Acetas, Liquor Plumbi Diacetatis.

PLUMBI ACETAS, *Acetate of Lead*. Old Names :
Superacetate of Lead, Sugar of Lead, Cerussa Acetata.

Take of Oxide of Lead, in powder, 4 pounds 2 oz.
Acetic Acid.....4 pints
Distilled Water4 pints

Having mixed the acid and water together, add the oxide of lead, and, a gentle heat being applied, filter the solution through paper ; evaporate and crystallize.

Although this is the process directed by the College of Physicians for obtaining this salt, and which differs from their last formula, yet it is but seldom had recourse to.

Acetate of lead, or sugar of lead, as it is designated in the arts, is much used by calico-printers ; and large quantities are made in Holland by immersing sheets of lead in pots half filled with distilled vinegar. The upper surface, by the action of the evaporating vinegar, becomes oxidized and covered with a carbonate : this is then inverted, when it is changed into an acetate by solution in the vinegar ; and the other portion, in its turn, becomes carbonated. This process is continued until the vinegar becomes turbid, when it is boiled down in tin vessels and set aside, so that crystals may form.

Decomposition.—This is an instance of single affi-

nity. The acetic acid, by the agency of heat, combines with the oxide, forming an acetate.

Composition.—1 equivalent oxide of lead = 112

1 acetic acid... = 51

3 water... $9 \times 3 = 27$

Equivalent.....190

Properties and Uses.—Acetate of lead occurs in the shops in the form of irregular masses, made up of acicular four-sided prisms, aggregated together. It is inodorous, and has a sweet and astringent taste. It is soluble in twenty-five parts of water, which, if it contain but the least trace of carbonic acid, throws down a precipitate of the carbonate; this may be prevented by the addition of a little acetic acid. Its specific gravity is 2.35.

The acetate of lead is seldom administered internally to the horse, although it is a powerful sedative and astringent; hence by the human practitioner it is given in cases of internal hæmorrhage. It is employed as a collyrium in ophthalmia, when a few grains may be dissolved in distilled water; the proportions being from gr. x to xx in ℥viii water: as a local application in phlegmonous inflammation, the quantity may be increased. Preference, however, appears to be given by veterinarians to the compound next to be described.

LIQUOR PLUMBI DIACETATIS, *Liquor of the Diacetate of Lead*. Old Names : Liquor Plumbi Subacetatis, Goulard's Extract, Aqua Vegeto-mineralis.

The formula for this compound is also changed.

Take of Acetate of Lead2 pounds 3 oz.
 Oxide of Lead, in powder, 1 pound 4 oz.
 Water6 pints

Boil them for half an hour, frequently stirring ; and, when cold, add of distilled water a sufficient quantity to measure six pints : lastly, strain the solution.

Oxide of lead, or litharge, is a yellow protoxide of lead, obtained either as a secondary product in the separation of silver from galena, or by exposing those particles of lead which have not been carbonated in lead manufactories to the action of heat in ovens. It consists of

$$\begin{array}{rcl}
 1 \text{ equivalent lead} & \dots\dots\dots & = 104 \\
 1 \dots\dots\dots \text{oxygen} & \dots\dots\dots & = 8 \\
 & & \hline
 \text{Equivalent} & \dots\dots\dots & 112
 \end{array}$$

and occurs in small shining hard scales, persistent in the air, and inodorous.

Decomposition.—Acetic acid is capable of combining with two equivalents of the oxide of lead, so that when to the acetate is added the protoxide, a com-

pound is formed consisting of two equivalents of base and one of acid.

<i>Composition.</i> —1 equivalent acetic acid ...	=	51
1 do. oxide of lead 112×2	=	224
Equivalent.....		275

Which is dissolved in variable proportions of water, and is, according to Dr. Paris, the only instance of a real subsalt being soluble in water.

Properties and Uses.—This compound has received the name of Goulard's extract, from its having been introduced by M. Goulard, of Montpellier, who appears to have designated it Aqua Vegeto-mineralis; hence the abbreviation employed at this Institution of Aq. Vegeto.

When properly prepared, it is of a pale yellowish-green colour, having an acetous odour, and a sweetish styptic taste. When ordinary vinegar is employed, the solution is much higher coloured. It is decomposed by the alkalies and the alkaline carbonates and sulphates; hence, when diluted with spring-water, a heavy precipitate of the carbonate of lead and lime is thrown down, giving to the whole opalescence. Even distilled water, from the presence, sometimes, of a little carbonic acid, will occasion a turbidity. It will be inferred from this, that only distilled water should be employed for its dilution. It is used, internally, for the purpose of reducing superficial inflammations

of the skin, and also as a lotion in ophthalmia. It has been conjectured that its value arises from its causing a partial paralysis of the nerves of the part to which it is applied. That the compounds of lead are sedatives, is proved by the fact adverted to of animals becoming constipated in their bowels where lead mines are. The like effects will follow on the administration of the acetate of lead in large doses, and the pulse will be by it rendered less frequent; but whether any marked action takes place on the application to the skin, I will not take upon myself to decide. It has been thought that the whole of the good obtained from the use of saturnine lotions is referrible to the direct application of cold, and that which arises from evaporation, to aid which a little spirit is added. The form is as follows :—

LIQUOR PLUMBI DIACETATIS DILUTUS, *Diluted
Solution of the Diacetate of Lead.*

Take of Solution of the Diacetate of Lead, 2 drachms
Rectified Spirit2 drachms
Distilled Water1 pint

Mix.

When used as a collyrium, the quantity of water is to be doubled.

A valuable liniment for excoriated surfaces, or after the application of a blister, may be made by triturating

together one part of the solution of the diacetate of lead and four parts of olive oil.

POTASSIUM, the Metallic Base of the Alkali *Potassa*.

The honour of the discovery of this metal, through which a new view was taken of the alkaline bodies, belongs to Sir H. Davy. Its properties are interesting and singular. Its colour is that of silver. At the ordinary temperature of the atmosphere, it is soft and easily moulded by the fingers; it is lighter than water, consequently it floats upon this fluid; its specific gravity is .865; weight of atom, 40. At 32° it is hard and brittle; at 150° it is quite fluid. Its affinity for oxygen is so great, that it instantly tarnishes on exposure to the air, becoming coated with an incrustation consisting of metallic potassium and its protoxide; nor can it be kept in any of the compounds of this element. Projected on water, it decomposes it rapidly, combining with its oxygen, and setting the hydrogen free; which, taking with it a small portion of the metal, forms potassiuiretted hydrogen, which inflames on coming into contact with the air.

Sir H. Davy developed the metal by the aid of galvanism. Hydrate of potassa was placed between two discs of platinum connected with the poles of the galvanic battery of the Royal Institution, when oxygen was evolved at the positive surface, and minute metallic globules at the negative. These, by re-union with

oxygen, formed potassa; and thus analytically and synthetically it was proved that the alkali potassa consisted of a metallic base, potassium, combined with oxygen. It was subsequently obtained by fusing the hydrate in a gun-barrel containing iron-filings: these attracted the oxygen, and, the metal being volatilized, was condensed in a receiver. Now it is procured by subjecting potassa, or its carbonate, to distillation in iron bottles, mixed with charcoal. The heat required is intense, and the process one in which great caution is necessary.

POTASSA, *Potash*, or the *Protoxide of Potassium*.

This compound may be obtained by the action of water on the metal potassium, when a solution of potassa is formed; but the expensiveness of this process precludes its general adoption. The usual means had recourse to are,—depriving a solution of the carbonate of potassa of its carbonic acid by the addition of newly-slaked lime, and evaporating the solution, after filtration, until a dry mass remains: this is afterwards to be fused. Rarely, if ever, is all the water driven off; the compound therefore is, strictly speaking, a hydrated protoxide, consisting of

1 equivalent potassium	=	40
1 oxygen	=	8
1 water	=	9
	—	
Equivalent.....		57

Hydrate of potassa, when carefully prepared, is a white acrid substance, possessing caustic properties. Cast into moulds, it constitutes the *Hydras Potassæ* of the pharmacopœia, and, in solution, the *Liquor Potassæ*. Seldom are these compounds employed in veterinary practice; the deliquescence of the first named is an objection to its general use, otherwise it is a very valuable caustic; whilst the carbonate is preferred to the last, from its being less acrid.

POTASSÆ CARBONAS IMPURA, *Impure Carbonate of Potassa*. Vulgo: Potash, Pearlash.

The pearlash of commerce is an impure carbonate of potassa, rendered so by the presence of silicious matter and some other salts. The manner of obtaining it is this:—The stems and branches of plants which grow at a distance from the sea are subjected to smothered combustion: their ashes being lixiviated by pouring over them hot or cold water, so as to dissolve the alkali, the impregnated solution is evaporated to dryness in iron boilers, when a brownish saline mass remains: from this the colouring matter and a portion of water being dissipated by calcination in a reverberatory furnace, the salt assumes a spongy texture and a blueish colour. This is pearlash, or potash; and with it the market is principally supplied from Russia and America.

It has been found that herbaceous plants, by inci-

neration, yield a large quantity of potash, and shrubs more than trees; but decayed wood more than either. Wormwood is particularly rich in this salt; hence at one time it was called the *salt of wormwood*. One thousand pounds of the ashes of this plant afford 748 pounds of potash.

The pearlash of commerce not being sufficiently pure for medicinal purposes, a purification of it has been directed, as follows:—

POTASSÆ CARBONAS, *Carbonate of Potassa*. Old Names: Subcarbonate of Potassa, Prepared Kali, Salt of Tartar.

This salt is procured by pouring over the pearlashes of commerce three or four times their weight of cold water, when a solution is obtained of the soluble carbonate, and the insoluble matters remain behind: the water being evaporated away by means of heat, a granulated mass results, which is carbonate of potassa; which, although not perfectly pure, is sufficiently so for ordinary purposes. A purer salt may be made by calcining cream of tartar (bitartrate of potassa); hence the name of *salt of tartar*, which was once given to this compound.

Composition.—In its dry state, it consists of

1 equivalent potassa	= 48
1 carbonic acid	= 22

Equivalent.....70

Usually, however, there is a little water present, forming it into an hydrate, or rather a sesqui-hydrate.

Properties and Uses.—Carbonate of potassa occurs in small white grains, which are imperfectly formed crystals. Its taste is acrid and alkaline; exposed to the air, it rapidly abstracts moisture from it, or undergoes deliquescence: this solution, from its having an oil-like appearance, was called *oil of tartar* by the old chemists. On this account, it should be always kept in stoppered bottles. It changes vegetable blues to green, neutralizes acids with effervescence, and combines with oil, forming soap.

It is an antacid and diuretic, and may be given in doses of from ʒij to ʒiv. The form of draught is most desirable.

POTASSÆ NITRAS, *Nitrate of Potassa*. Old Names :
Nitre, Salt Petre.

This salt may be made by saturating nitric acid with potassa; but it is only procured thus experimentally. As a natural product, it is found efflorescing on old walls, and in caverns, and very abundantly in the soil of India, whence the market is principally supplied. It is also prepared artificially in France and Germany.

The presidency of Calcutta annually exports 8000 tons of nitre, which comes into the market in bags containing 164 pounds weight each. The soil appears to be merely lixiviated, and the salt crystallized, when

it occurs in small crystals of a dirty brown colour, which are much contaminated with common salt and other impurities ; from these it is separated by solution, filtration, and re-crystallization.

The artificial mode of obtaining nitrate of potassa consists in mixing together animal and vegetable remains with calcareous matters, strewing them in a shallow pit covered so as to keep off the rain, but permitting, at the same time, the access of atmospheric air, to effect the necessary changes. The whole is frequently stirred, so as to expose it to the action of the air, and from time to time a solution of pearlash is thrown over it. At the end of two or three years, the mass is considered fit to yield nitre, when the processes of lixiviation, filtration, and crystallization, are had recourse to.

The change which takes place is this :—The animal matter, undergoing decomposition, evolves nitrogen, which combines with the oxygen of the air, and forms nitric acid : this is attracted by the lime of the calcareous matter, and thus a nitrate of lime is obtained, which is immediately decomposed by the potassa contained in the vegetable substances ; but as this is seldom sufficient to effect its entire decomposition, more is added in the state of pearlash. The resulting compounds are a nitrate of potassa and a carbonate of lime.

<i>Composition.</i> —1 equivalent potassa		= 48
1	nitric acid ...	= 54
		—
Equivalent.....		102

It contains no water of crystallization, but a little is frequently interposed between the laminæ of its crystals.

Properties and Uses.—Nitrate of potassa occurs in six-sided prismatic crystals, which are colourless and brittle, having a sharp taste, and imparting to the mouth a sensation of coldness. It is soluble in seven parts of water at 60°, and in its own weight of boiling water. During solution, it lessens the temperature of the water. It is persistent in the air. Exposed to heat, it undergoes fusion; and this being cast into moulds, has received the name of Sal Prunelle. If the heat be increased, it suffers decomposition; oxygen gas is first driven off, and a nitrite of potassa is left behind.

Internally administered, nitre is a febrifuge and diuretic. The dose may be from ʒij to ʒiv. To obtain its full effect as the first, it should be exhibited in the form of ball, so that it may undergo solution in the stomach; but as a diuretic, it is best given in solution. It passes to the kidneys unchanged, and its presence may be readily detected in the urine by means of bibulous paper immersed in it, which, on being dried and set on fire, deflagrates; or it may be procured in crystals from the urine, if the quantity given be large.

Externally applied, it is a valuable stimulant to wounds, and it may be with benefit employed when gangrene has taken place. For this purpose, a saturated solution is made use of at this establishment.

PTEROCARPI SANTALINI LIGNUM, *Red Saunders Wood.*

The tree yielding this wood is a native of India and Ceylon, thriving most luxuriantly in mountainous and rocky situations. It is brought to this country in billets, which are heavy, and sink in water. In the shops it is met with in the form of raspings, which is effected in a mill.

Properties and Uses.—Saunders wood has a rich red colour, which it readily imparts to a mixture of alcohol and water, but not to water alone. A tincture of it may be thus made:—

TINCTURA SANTALINIS RUBRA, *Tincture of Red Saunders Wood.*

Take of Raspings of Saunders Wood ...1 ounce
Proof Spirit.....2 pints

Macerate for seven days, and filter for use. It is employed merely for the sake of its colour.

SAPO, SAPO DURUS, SAPO MOLLIS, *Soap, Hard Soap, Soft Soap.*

Soaps are now regarded as saline compounds, re-

sulting from the union of margaric, stearic, and oleic acids with an alkaline base, such as soda or potassa.

For medicinal purposes, it has been directed that soap should be formed of the purest materials; hence those countries in which the olive tree abounds, as the south of France, Italy, and Spain, have produced a compound preferable to that of this country. For the uses of the veterinarian, however, this does not appear to be of so much moment, and probably the best kind of hard soap which can be employed by him is the English curd soap, the only important difference between this and the Spanish or Castile being, that the one is made with the oil of the olive, the other with tallow and soda.

The process of making hard soap essentially consists in boiling the oleaginous or fatty matters in solutions of the alkali soda, rendered caustic by quicklime, constantly stirring the mixture until a union has been effected, which is evidenced by its acquiring viscosity: it is then poured into moulds, where it cools, and in a few days becomes hard. A little common salt is likewise added. The marbled appearance which the Spanish soap has, is imparted to it by sprinkling into the newly-formed compound a little of the oxide and sulphate of iron.

Soft soap is formed by using a ley of potassa instead of soda. The art appears to depend upon effecting the combination in such a manner that the soap

ceases not to be in solution; hence the compound is soft or pasty.

Composition.—This has been already laid down. When mutton fat is used, the predominating acid will be the stearic; when olive oil, the margaric; and when linseed and other oils, the oleic.

Properties and Uses.—The external characters of soaps are too well known to need description. The English curd soap is colourless, and of a fine consistence; does not feel greasy, and has a nauseous alkaline taste. With water it forms a milky solution. Alcohol, likewise, dissolves it, forming a gelatinous and nearly pellucid solution.

Soft soap is about the consistence of hogs' lard; it is transparent, and has small granules scattered throughout it, which consist of stearine.

In large doses, soap may prove a laxative. More probably, however, in the quantities in which it is usually administered, from $\mathfrak{z}\text{ss}$ to $\mathfrak{z}\text{j}$, it undergoes decomposition in transitu, and its base is carried to the kidneys, which are excited to increased action; but, whether as a cathartic or a diuretic, its agency is not to be relied on. It is more valuable as an antacid, since it is decomposed by the weakest acids, when its alkali, being liberated, combines with and neutralizes them; hence the reason why it does not form a perfect solution with hard water. The sulphuric acid of the sulphate of lime in the water unites with the soda or potassa,

and is dissolved, whilst the margaric, stearic, or oleic acid blends with the lime, and rises to the top ; hence, also, its incompatibility with all acids and acidulous salts which will combine with its base. Many metallic salts likewise decompose it, as the nitrate of silver, the chloride and bichloride of mercury, and the sulphates of zinc, copper, and iron ; therefore, in excessive doses of any of these, it may be given with advantage.

Externally, it is a stimulant, and is employed beneficially in cases of sprains and bruises, after the inflammatory action has been reduced by the ordinary antiphlogistic remedies. The form of liniment is preferred, which may be thus made :—

LINIMENTUM SAPONIS COMPOSITUM, *Compound
Liniment of Soap.*

Take of Soft Soap	4 ounces
Camphor	1 ounce
Proof Spirit	2 pints
Liquor of Ammonia	$\frac{1}{2}$ pint

Dissolve the soap and the camphor in the spirit, then add the liquor of ammonia, and filter for use.

The old name for this compound is Opodeldoc.

SECALE CORNUTUM, *Ergot of Rye.*

Common Name : Spurred Rye.

Two opinions have divided the scientific world re-

specting this substance. By some it is thought to be a disease of the grain, produced by the puncture of insects ; by others, a fungus and parasitic plant, which locates itself in the ovary of many of the grasses, but found more commonly upon rye than upon other grains : this last is the most prevalent opinion.

Properties and Uses.—Ergot of rye is a curved, cylindrical, and striated body, occurring about half an inch in length ; externally of a deep violet colour, and internally whitish. It has a mawkish taste, and burns with flame. It is a parturient, but its active principle remains unknown. Its influence on the uterus is undisputed, causing an expulsion of any substance from this viscus when inactive. It has been said at times to be uncertain in its operation ; and what medicinal agent is not ? This may arise from the quality of the drug, which is much affected by circumstances. In its investing tunic appears to reside its activity ; and as this may be rubbed, or washed off by rains, the remaining part is inert. Imitations of the spur, formed of plaster of Paris, have been also found in some samples. To insure its effects, it should be carefully kept in well-stoppered bottles, and never used after it is one year old. The dose may be from $\mathfrak{z}\text{ij}$ to $\mathfrak{z}\text{iv}$ in powder, given in ale or beer ; but as it acts as an excitant to the parturient uterus, causing contraction in it, it should not be given until the regular throes are considerably diminished, and the pauses be-

tween them have somewhat increased. I know of but one instance in the mare in which it has been employed, and that was with success, by Mr. Richardson, of Lincoln; but both Mr. Youatt and Mr. C. Spooner speak highly of it in cattle and other animals labouring under difficult and protracted parturition; and such authorities as these bear with them their own weight.

SODIUM, *Sodium*. The Metallic Base of the Alkali *Soda*.

This was discovered by Sir H. Davy, by the same means as he developed the metal potassium, to which it bears a close resemblance. It is a soft substance, having the colour of mercury, and a specific gravity somewhat greater than potassium, being .972. Its atomic weight is 24. There is likewise this farther difference between it and potassium: although it possesses for oxygen a great affinity, and hence cannot be kept in any of its compounds, yet when thrown on water it does not decompose it with flame, as potassium does, unless there be dissolved in it some gum, so as to render the water viscid.

SODÆ CARBONAS IMPURA, *Impure Carbonate of Soda*. Vulgo: Barilla, Soda.

This saline compound is obtained by incinerating the ashes of sea-weeds; it is also found native in many

parts of the world, particularly Egypt, the natron lakes of which are familiar to most by description. But little of this finds its way to Britain, the market being supplied either from the shores of the Mediterranean, where the *salsola* plant is cultivated expressly for the sake of its salt, or from the Orkney islands, where the *sea-wrack* is employed. The process is simple: the plants being pulled up by their roots, are dried and burnt in furnaces resembling lime-kilns, the heat being sufficient to cause the ashes to run together into a state of semi-fusion; on cooling, this concretes in masses. That obtained from the Mediterranean is denominated *barilla*, and is the best; that from Scotland, *kelp*; and, from its yielding but little of the carbonate, it is the least valuable. The salt is supposed to exist ready formed in the vegetable, and to be set free by the act of burning. It is also largely prepared from common salt.

Composition.—These are necessarily very impure compounds. They consist of the carbonates of soda (in the one there being one-fifth, in the other but one-twentieth), and magnesia, muriate of soda, sand, oxide of iron, and water.

Properties and Uses.—Good *barilla* occurs in cellular masses, having a blueish colour, which soon become covered on the surface with an efflorescence. It should emit no odour. *Kelp* is more solid, and gives out a sulphurous smell. Both are employed only for the sake of the purer carbonate.

SODÆ CARBONAS, *Carbonate of Soda.*

This salt is procured by lixiviating barilla, or kelp ; or, according to the College, two pounds of barilla, in powder, are to be boiled in four pints of distilled water for half an hour, and filtered. Evaporation is then to be had recourse to, and crystals are allowed to form.

Composition.—1 equivalent carbonic acid = 22

1 soda = 32

10 water = 90

Equivalent.....144

Properties and Uses.—Carbonate of soda is crystalline in its structure, the form of its crystal being a truncated octohedron. It is soluble in twice its weight of water at 60°, and in less than its own weight of boiling water. It effloresces on exposure to the air, which distinguishes it from the carbonate of potassa, from which it may be also known by means of a solution of tartaric acid, which forms with the latter an insoluble bitartrate. Potassa and soda were at one time designated the vegetable and mineral alkalies, terms which are not now used, as they convey wrong impressions.

As a medicinal agent, the carbonate of soda is to be preferred to that of potassa. It is less acrid, and bears a closer analogy with animal substances, it being found in most of the fluids of the body. It is an antacid, and probably diuretic. It may be given in doses of from ʒij to ʒiv.

SODÆ CHLORIDUM, *Chloride of Soda.*

This compound is made by passing a current of chlorine gas through a dilute solution of the carbonate of soda.

Composition.—This appears not to be accurately known.

Properties and Uses.—Chloride of soda, or chlorinated soda, is a disinfectant, and it may be employed for the same purposes as the chloride of lime, for which, as an internal remedy, perhaps, it would be as well to substitute it, as the resulting compound in the stomach will be a little hydrochlorate of soda instead of that of lime; but, as an external agent, it must yield to the chloride of lime.

SODÆ SULPHAS, *Sulphate of Soda.*

Old Name: Glauber's Salt.

This salt, from having been first prepared by Glauber, a German chemist, received the name of Glauber's salt. It is found in many mineral waters, and also effloresced on the surface of the soil in some places; but as an article of commerce, it is obtained as secondary product in the making of muriate of ammonia, although the College of Physicians directs that the residuum, after the formation of muriatic acid, is to be saturated with the carbonate of soda, and crys-

tallized: the compound thus procured, however, is not worth the price of the soda employed; and it has, therefore, been proposed to substitute lime for the soda, and reject the sulphate of lime; but by far the greater quantity used is the result of the action of common salt on the sulphate of ammonia, as before observed.

Composition.—1 equivalent soda = 32
 1 sulphuric acid = 40
 10 water = 90

—————
 Equivalent.....162

Properties and Uses.—Sulphate of soda occurs in crystals, which are six-sided channelled prisms, efflorescing rapidly in the air, soluble in three times their weight of water at 60°, and in an equal weight of boiling water. The taste is saline, bitter, and nauseous. This salt, according to Mr. B. Clark, is only a diuretic in the horse: for cattle it is used extensively as a purgative, in doses of a pound or more. Its action is accelerated by the addition of from twenty to thirty grains of croton farina, withholding half the quantity of sulphate of soda, which otherwise would be administered. It is, however, fast yielding to the sulphate of magnesia, which is more certain in its action.

which will induce him to eat it with avidity. It gently stimulates the stomach and alimentary tube, thus increasing the power of the digestive organs, by which the tonicity of the system is restored. In larger doses, it is said to be an anthelmintic. When the horse, the cow, or the sheep is becoming convalescent, and the natural and sanitary stimulus of wholesome food will produce a more certain as well as a safer impulse to the discharge of the natural functions than any medicine can afford, a little salt or salted water sprinkled on the food will be an admirable provocative.

Mr. Youatt says there is no medicine for the rot in sheep, that is of the slightest avail, in which culinary salt is not the principal ingredient.

It is frequently used as an adjunct to clysters.

Externally applied, dissolved in water, in the proportion of one pound to a gallon, it is employed as a stimulant in chronic sprains ; at least, I am inclined to believe this to be its action.

SPIRITUS ÆTHERIS NITRICI, *Spirit of Nitric Æther.*

Old Names : Spirit of Nitrous Æther, Sweet Spirits of Nitre.

Take of Rectified Spirits3 pounds

Nitric Acid4 ounces

Add the acid gradually to the spirit, and mix ; then distil off thirty-two fluid ounces. P. L.

Decomposition.—During the process, both the

nitric acid and a portion of the alcohol suffer decomposition. An equivalent of nitric acid loses two equivalents of oxygen, and is thus reduced to hyponitrous acid, whilst an equivalent of æther is at the same time formed; and these, by combination, form hyponitrous æther, or hyponitrite of æther, so that the *spiritus ætheris nitrici* of the pharmacopœia is a mixture of hyponitrous æther and alcohol. According to Phillips, "the oxygen lost by the nitric acid produces various compounds with the elements of those portions of alcohol which are decomposed, and yet not converted into æther; thus, with its hydrogen it forms water, and with carbon carbonic acid, which is evolved, and oxalic acid, which remains in the retort. With portions of hydrogen and carbon, it gives rise to acetic and malic acids; and when the operation is long continued, a quantity of nitric acid loses more oxygen, so as to be reduced to nitric oxide gas, and probably even nitrous oxide and azote are evolved."

<i>Composition.</i> —		4 equivalents carbon ...	$6 \times 4 = 24$
	5	hydrogen 1 ...	$5 = 5$
	1	nitrogen	$= 14$
	4	oxygen ...	$8 \times 4 = 32$
			—
		Equivalent.....	75

Properties and Uses.—Spirit of nitric æther is a colourless fluid, having a fragrant odour, and a pungent slightly acid taste. Its specific gravity should

not exceed .834. It is inflammable and volatile, producing much cold during evaporation. It is an antispasmodic, a diuretic, and diaphoretic. My authority for the last-named action is Mr. J. Field. "Nitric æther," he says, "is an admirable remedy: it is a stimulant and diaphoretic." Could no other be adduced, I should be perfectly contented with this; but I know this agent to be employed by many practitioners, with decided action on the skin. The dose may be from one to two ounces, given either in tepid water, or, what is better, in combination with the solution of the acetate of ammonia, assisting the action of the capillaries by clothing, otherwise its effects will be determined to the kidneys.

SPIRITUS RECTIFICATUS, *Rectified Spirit.*

Common Name: Spirit of Wine.

When certain vegetable substances are subjected to the action of heat and moisture, they undergo definite changes, which are, under one head, denominated fermentation. The stages of this process are three: first, the vinous; second, the acetous; and, third, the putrefactive.

By the first is obtained the spirit under notice. The seeds of plants consist principally of farinaceous matter; this frequently becomes changed into sugar; and although the manner in which the transition is

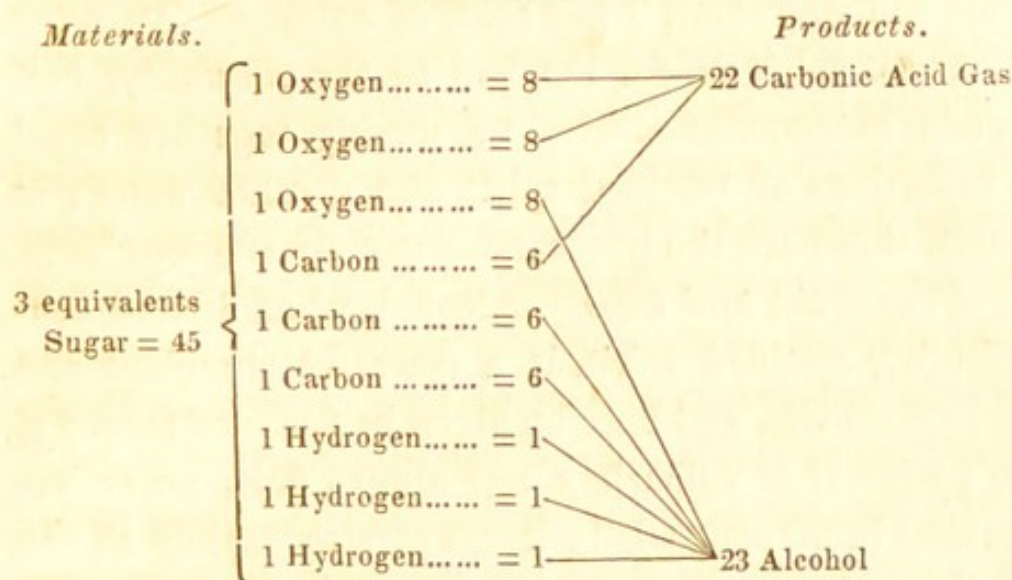
brought about is but little understood, yet it would appear to consist in a new arrangement of the ultimate elements of the principle, since, according to Dr. Prout, gum, sugar, and starch, are made up of the same constituents, in the same proportions; they are, consequently, isomeric bodies. This change takes place in the germination of the seed, as seen in the formation of malt. I need hardly add, that sugar is likewise an abundant proximate principle, being yielded by the sugar-cane of India, which is cultivated largely in our colonies for the sake of its produce; and it is also afforded by the juices of many other vegetables, as the maple tree, beet-root, parsnip, carrot, &c. Hence the value of these latter as nutritive food.

Saccharine solutions having had the fermentative process set up in them, by exposure to a medium temperature, and the addition of a little yeast, are found to contain a spirituous compound, which is combined with colouring matter, extractive, and other principles. These are separable by distillation, when that which passes over is designated ardent spirits—such are brandy, rum, gin, arrack, whiskey; these names being given to certain modifications of alcohol, as it is flavoured with different essential oils or acids, imparted either naturally or artificially.

By a re-distillation of these, rectified spirit is obtained; the water and accidental impurities remaining behind in the body of the still.

The following diagram will illustrate the change which takes place in the sugar, three equivalents being used.

The Change which Sugar undergoes in Vinous Fermentation.



Rectified spirit occurs of various strengths in the shops; the best method of ascertaining which is to take its specific gravity. This, according to the London College, should be at 60° F., .835, when it contains 85 of pure alcohol, and 15 water, in 100 parts. In proportion to the quantity of water present beyond this, so will its specific gravity increase. Other plans have been suggested, such as the degree of cold generated by its evaporation, the quantity of water abstracted by dry carbonate of potassa, and the capability of its firing gunpowder. This last, however, is a vague test, and greatly depends upon the quantity tried.

By the term alcohol is meant an anhydrous spirit : very rarely, however, is this obtained. The College of Physicians directs, for the obtaining of alcohol, that a gallon of rectified spirit be distilled from over three pounds of dried carbonate of potassa ; but even this contains about 7 per cent. of water.

Proof spirit is, for the use of the pharmacy, best made extemporaneously, by mixing together equal proportions of rectified spirit and distilled water ; at least, these are the proportions usually employed.

Properties and Uses.—Alcohol, when diluted, constituting rectified spirit, is a powerful stimulant and antispasmodic, and may be given in doses of from f ʒj to f ʒij. It is colourless, and always fluid, never yet having been congealed ; it evaporates rapidly at the ordinary temperatures of the atmosphere, generating much cold ; hence it is added to refrigerating lotions. It boils at 163° , is inflammable, and burns with scarcely any smoke. It has a fragrant odour, and a hot pungent taste. It dissolves resins and essential oils, forming varnishes and perfumed essences ; and when still farther diluted (proof spirit), it is the best solvent for the greater number of the proximate principles of vegetables, forming solutions designated tinctures.

SULPHUR, *Sulphur*. Common Name : Brimstone.

This is an elementary substance, found abundant in volcanic countries, and in combination with many

metals, as iron, copper, lead, and antimony. Native sulphur is imported from Sicily, where it is found associated with limestone and the sulphates of lime and strontia, from which ore it is extracted by melting in furnaces made in the earth. The sulphurous stones are raised into a cone in those cauldrons, and covered with earth, an opening being left at the top; fire being introduced, it soon communicates with the interior of the pyramid, and in about seven or eight hours the sulphur is found at the bottom of the furnace in a liquid state, from which it is drawn and cast into moulds.

ROLL SULPHUR is chiefly obtained from the sulphuret of copper, by roasting the mineral and collecting the fumes in a chamber of brick-work. It is subsequently purified by fusion, and cast into rolls.

SUBLIMED SULPHUR is procured from roll sulphur, by heating it to 500° or 600° F., when it rises rapidly in the form of vapour, which, being received in a fit receptacle, constitutes the flowers of sulphur of commerce; what remains behind is called *sulphur vivum*.

Properties and Uses.—Sulphur is of a pale yellow colour, emitting an unpleasant odour when heated, and burning with dense suffocating fumes. It has a specific gravity of 1.99, and is found in the market in the states already named.

As a therapeutic agent, it is extolled as a laxative and alterative. As the former, it is rarely used in

veterinary practice until the bowels have been previously opened by some stronger and more certain aperient. When the bowels of cattle and sheep have been excited to action by the sulphate of magnesia, the action is, to a moderate extent, and with perfect safety, kept up by doses of sulphur, from six to eight ounces for cattle, and from two to three for sheep. As the latter, it is usually administered in combination with the nitrate of potassa and the sulphuret of antimony. I am informed, that when long given, and in large doses, a portion of it transpires unchanged through the pores of the skin.

Externally, I believe it to be valuable in many cutaneous affections ; for instance, in mange, being made into a liniment with oil, to which may be added pyroligneous tar or the oil of turpentine, to increase its power.

TEREBINTHINA, *Turpentine.*

By this generic name many varieties are known in pharmacy. They are all obtained from different species of the pine-tree. Some exude spontaneously ; others flow from wounds made in the bark, and are inspissated by subsequent exposure to the sun. In veterinary medicine we can dispense with most of them, since the chemical and medicinal properties of all closely resemble each other.

TEREBINTHINA VULGARIS, *Common Turpentine.*

This, which is the produce of the Scotch fir, is most commonly employed, and is the only one required by the veterinarian. It is obtained by making a series of wounds through the bark, into the wood of the tree, beginning at its base, and ascending until a stripe of bark about nine feet long is removed. The resinous juice soon begins to flow, and is received in a cavity dug in the earth. From time to time it is removed and strained, which is effected by causing it to percolate through a cask having a bottom with holes in it; through these the turpentine passes, and the impurities are retained behind. Those trees which are most exposed to the sun yield the greatest quantity of juice, and this is necessarily more abundant in some seasons than others. A fine tree will afford from six to twelve pounds of turpentine annually, commencing at the age of forty, and continuing to do so for a century, the wounds being made in different parts of the tree. The market is supplied from the north of Europe, the packages being casks, containing from three to four hundred-weight.

Common turpentine has a dull yellow colour, much viscosity, a peculiar and not disagreeable odour, and a hot acrid taste. It is soluble in alcohol and the fixed oils, imparts to water its flavour only, is highly inflammable, and burns with a dense smoke.

Composition.—Resin, essential oil, and a peculiar acid, the succinic. These are separable from each other by distillation.

Properties and Uses.—Internally administered, in doses of from $\mathfrak{zss}$ to $\mathfrak{zj}$, turpentine is a diuretic. Externally, it is employed as a stimulant to excite the suppurative action in wounds, and its compounds are the best which can be had recourse to for this purpose. The digestive ointment of the College is thus made :—

UNGUENTUM TEREBINTHINÆ, *Ointment of Turpentine.*

Take of Common Turpentine.....1 part
Hogs' Lard3 parts

Melt together in a water bath.

TEREBINTHINÆ OLEUM, *Oil of Turpentine.*

It must have been seen that common turpentine is an oleo-resin. The oil being volatile, it is obtained by distillation ; for which purpose, any quantity of turpentine is put into a copper alembic with water, and heat applied, when about a fourth part of an essential oil passes over into the receiver, with the water, on which it floats. A re-distillation of this is directed by the College of Physicians, but this refinement is uncalled for by the veterinarian.

Oil of turpentine, sometimes called spirit of turpentine, is a limpid colourless fluid, highly volatile, of a

less specific gravity than water, having a hot pungent taste, and a penetrating terebinthinate odour. It is inflammable, and possesses all the other characters of an essential oil.

Properties and Uses.—The action of this agent depends upon the quantity administered. In doses of from ℥ij to ℥iv it operates as a diuretic, and it affords an elegant means of giving this therapeutic in the form of a draught, blending it with the yolk of an egg or mucilage, so as to form an emulsion with water. The urine afterwards will have the odour of violets.

In doses of from ℥iij to ℥vj, it acts as an antispasmodic, and is employed at this Institution with the greatest success. It may be carefully given floating on water, or combined with an equal quantity of oil, or a watery solution of aloes. The addition of from half an ounce to an ounce of the tincture of opium is by many advocated. Some little care in giving it is necessary, as, should it be thrown over the animal, it will create much irritation. This may be immediately allayed by washing with warm water, in which a little soda or potash is dissolved.

In doses of a pint, it acts on the primæ viæ, causing catharsis, and producing scarcely any effect on the kidneys. A terebinthinate enema has been recommended in cases of obstinate constipation of the bowels. From two to four ounces may be thrown up in thin mucilage. It has also been extolled as a vermifuge,

particularly for tænia. The presence of this parasite is comparatively rare, and, I opine, but vaguely indicated.

Externally applied, its effects are marked. To the skin it is a very active irritant; and, if employed unmixed, the animal is by it thrown into a state of violent excitement, which continues for some time. On mucous membranes and abraded surfaces no such action takes place. Mixed with oil, it becomes a valuable rubefacient and digestive. The following is the ordinary form of the College:—

LINIMENTUM TEREBINTHINÆ, *Liniment of Turpentine.*

Take of Oil of Turpentine,
Oil of Olives, of each equal parts

Mix together.

RESINA, *Resin.*

I prefer placing this substance here, because it is the residuum after the distillation of common turpentine. The essential oil having passed over into the receiver, in the retort remains a brittle semi-transparent mass, which is resin.

Two kinds of resin occur in the market,—amber-coloured and yellow. If the process of distillation be carried on to dryness, without any addition, some traces of empyreuma will occur in the residuum, and

the substance remaining behind will be the amber-coloured resin. When, however, a little water is added, whilst the turpentine is yet fluid, and blended with the resin by agitation, the mass becomes opalescent, and of a yellow colour.

Resin has been conjectured to be a volatile oil saturated with oxygen, since this last, if exposed to the air, absorbs oxygen, and becomes solid. Rarely can resin be rendered perfectly odourless and tasteless, a little being retained by some essential oil remaining. It is insoluble in water, but readily so in alcohol and volatile oils. Some of the fixed oils likewise dissolve it, and many of the acids. With alkaline leys it forms a saponaceous solution. Exposed to heat, it melts, and, if allowed, takes fire, burning with flame and volumes of smoke.

Resin is a diuretic, and may be given in doses of from half an ounce to six drachms. It enters into the composition of most diuretic masses. The form adopted by the College is this:—

Diuretic Mass.

Take of Resin, pulverized,

Nitrate of Potassa, do.

Hard Soap, of each equal parts

Beat together, so as to form a uniform mass. Dose from ℥j to ℥iss.

Externally applied, resin is a calefacient. It forms

the basis of adhesive plaisters, and of what are designated charges. A digestive ointment may be also made by melting together two parts resin and four parts lard, this being substituted for that of turpentine during the summer.

In dispensing, whenever turpentine is ordered, I have always used a mixture of four parts resin and one of essential oil of turpentine, by which both cleanliness and expedition are secured, whilst the compound is the same, as turpentine is thus formed synthetically.

VERATRUM ALBUM, *White Hellebore.*

Officinal: *Veratri Radix*, White Hellebore Root.

The plant is a perennial, and native of the mountainous parts of Germany, Italy, Switzerland, and Greece. The root, the part medicinally employed, is fleshy and fusiform, sending off many small fibres. When recent, it has a strong disagreeable smell, which it loses on drying. As it is found in the shops, it is dark-coloured without, and light within, breaking with a starchy fracture. The larger part is cut transversely, the smaller longitudinally. It should be chosen solid, heavy, and free from worm-holes.

Composition.—According to Pelletier, fatty matter, acidulous gallate of veratria, yellow colouring matter, starch, gum, lignin.

Properties and Uses.—Did no other authority than Mr. Percivall exist, this would be sufficiently high to warrant the introduction of this agent into the veterinary materia medica as a nauseant. Through him I know it to be employed by many, and I have repeatedly witnessed its effects as recorded by him. It may be given in doses of from twenty to thirty grains every four or six hours, until its action is manifest. As soon as this takes place, the repetition of the dose should be carefully avoided, lest efforts to vomit are produced. In this the scientific practitioner is seen, and, at the same time, this effect operates as an objection to the general use of hellebore, since it can only be administered under the immediate eye of the veterinary surgeon. In larger quantities than those named, as from $\mathfrak{z}\text{ss}$ to $\mathfrak{z}\text{j}$, it acts as a violent excitant to the whole system ; and, according to Mr. Wright, of Burnham, in Norfolk, who employs it in chronic œdematous enlargements of the legs, it rouses the absorbents into increased action. Care is requisite lest inflammation be set up in the mucous lining of the stomach and intestines ; demulcents, therefore, should be freely given when its operation is violent, nor should it ever be administered in these doses until after the bowels have been acted upon by a purgative.

Externally applied, either in the form of an ointment, liniment, or decoction, it is a local stimulant, and is used in mange and some few other cutaneous affec-

tions. If the quantity be large, its action as a nauseant will be seen : to dogs it has often proved fatal.

This root, according to Orfila, was the purgative of the Greeks, although others dispute this, accepting the black hellebore instead of it. Its active principle, veratria, is very violent and dangerous in its operation, causing hypercatharsis, accompanied with the discharge of blood, and much griping. I have seen half an ounce of the recently pulverized root, given in the form of draught, produce purgation in the horse in half an hour ; nevertheless, I would not be thought to advocate its employment for this purpose.

ZINCUM, *Zinc*.

This metal is extracted either from the native carbonate, calamine, or sulphuret blende. The ore, reduced to small pieces, is exposed to heat, so as to dissipate the acid of the former and the sulphur of the latter. It is then mixed with charcoal, and subjected to a rude form of sublimation in pots, resembling oil jars in shape, which have an iron tube passing up through them, the lower extremity being immersed in water. These being filled with the mixture, and placed in the smelting furnace, the metal is reduced, and gradually escapes down the tube into the water in the form of globules, which are afterwards cast into ingots.

Zinc, as met with in commerce, is rarely pure ;

when it is, it has a brilliant white colour, inclining to blue. It is brittle, crystalline, and has a specific gravity of about 6.8. The weight of its atom is 32. It is highly inflammable, burning with a blue flame.

ZINCI CARBONAS IMPURUM PRÆPARATUM, *Prepared Impure Carbonate of Zinc.* Prepared Calamine.

This, in pharmacy, is the native carbonate calcined and brought into a fine powder by levigation and washing, in the same manner as directed for the preparation of chalk.

ZINCI OXYDUM, *Oxide of Zinc.*

This is obtained by projecting pieces of metallic zinc into a crucible heated to redness, having another inverted over it, but not so as to exclude the air. The metal, when very little above its melting point, attracts oxygen from the atmosphere, and burns with a dazzling flame of a blueish tint, producing an oxide in the form of light flocculi, formerly called *flowers of zinc*.

The London College directs that the oxide be precipitated from a solution of the sulphate, by means of water of ammonia, subsequently washing and drying the powder upon a sand-bath.

Both this and the above compound of zinc are mild astringents, and employed as external applications, being sprinkled over excoriations, ichorous ulcers, and

superficial inflammations. Either would form a substitute for the farriers' bole. If required more stimulating, a useful powder may be formed by the mixture of one part of pulverized resin with two parts of prepared calamine, or oxide of zinc.

ZINCI SULPHAS, *Sulphate of Zinc*. Old Names :
Vitriolated Zinc, White Vitriol, White Copperas.

This salt is directed to be prepared in the following manner by the London College :—

Take of Zinc, in small pieces5 ounces
Diluted Sulphuric Acid...2 pints

Mix them in a glass vessel, and, the effervescence being over, filter the solution through paper ; evaporate and crystallize.

Decomposition.—In this process the water suffers decomposition. Its oxygen oxidizes the metal, which oxide is dissolved by the sulphuric acid, forming it into a sulphate, whilst its hydrogen is rendered gaseous, and escapes.

<i>Materials.</i>		<i>Products.</i>	
9 Water.....	{ Hydrogen.....1	1 Hydrogen	
	{ Oxygen.....8		
32 Zinc	32	80 Sulphate of Zinc	
40 Sulphuric Acid	40		

The water is ordered in excess, otherwise the oxide, as it is formed, would be thrown down and impede the action.

Composition.—The compound sold in the shops under the name of *purified sulphate of zinc*, occurs in crystals, which are four-sided, and terminated by four-sided pyramids, having an acidulous, styptic, metallic taste. It consists of

1 equivalent oxide of zinc	= 40
1 sulphuric acid.....	= 40
7 water 9×7	= 63

Equivalent.....143

But by far the greater quantity of sulphate of zinc is prepared from the native sulphuret, by roasting and then exposing it to air and moisture, when the sulphur becomes changed into sulphuric acid, and the metal oxidized; and these, by union, form the sulphate, which is obtained by lixiviation and crystallization.

Evaporation is generally carried on until the salt concretes into hard granular masses. Thus made, it frequently contains other sulphates in combination, as those of lead, iron, and copper. These, if thought necessary, may be abstracted by re-solution and slow re-crystallization on some granulated zinc. The sulphate of lead will subside, and the other salts be decomposed by the metallic zinc. But perhaps this refinement is not called for by the veterinarian; and as the sulphate of zinc of commerce contains less water of crystallization, it forms for him a more active agent.

Properties and Uses.—Sulphate of zinc is a colour-

less slightly efflorescent salt, soluble in two and a half times its weight of water at 60° , and in less than its own weight of boiling water. It is astringent and tonic. Rarely is it administered internally. Externally applied, it is a valuable compound, being used as an excitant to wounds, and to bring about adhesion of surfaces ; hence, agreeably to the recommendation of Mr. Newport, it has been extensively employed here with the greatest success in cases of quittor. Injected in a state of solution into other sinuses, it is equally beneficial, also into cavities in which the healing process is tardy.

A solution thus made is directed to be kept in the College pharmacy :—

SOLUTIO ZINCI SULPHATIS, *Solution of Sulphate of Zinc.*

Take of Sulphate of Zinc.....1 part
Water.....3 parts

Dissolve, and filter.

If much iron be present in the salt used, it will be thrown down in the form of oxide, giving to the solution a dirty appearance : it may be separated by filtration.

This being nearly saturated, judgment is called for on the part of the practitioner in its application.

As a collyrium, a weak solution of this sulphate is at times recommended. It would be, perhaps, better to substitute the acetate, which is best made by mix-

ing a solution of the acetate of lead with a solution of the sulphate of zinc, when a double decomposition takes place, and two new salts are formed—a soluble acetate of zinc, and an insoluble sulphate of lead: this last may be separated by means of bibulous paper, and the clear solution employed; or from ʒss to ʒj of each of the salts may be dissolved in a pint of distilled water, and the supernatant fluid decanted for use.

Sulphate of zinc is not accepted as a caustic, yet it appears to possess erodent properties. As a caustic, the *chloride of zinc* has been lately introduced. It is made by distilling one part of zinc with four of corrosive sublimate; or, what is better, by evaporating to dryness a solution of zinc in hydrochloric acid.

It rapidly deliquesces on exposure to the air; therefore it requires to be kept in closely-stoppered bottles. It blanches muscular fibre, and quickly destroys it. To the finger it imparts a saponaceous feel, from its action on the cuticle, which is accompanied with the generation of heat. The surface which it leaves behind readily takes on the healing process. I have employed it in only one case, in which its influence was very marked. It is deserving of a further trial.

ZINGIBERIS RADIX, *Ginger Root.*

The ginger plant is a native of the East Indies, but now largely cultivated in the West. The islands of Barbadoes and Jamaica afford large quantities to the

market ; and the produce of the last named is much esteemed. That which is known by the familiar name of ginger is the tuber or rhizome, a reservoir of nutriment for a future plant occurring at the base of the stem. When the herbaceous parts of the plant have withered, the roots are dug up ; the tuberous portions are then removed, the best selected, scraped, washed, and dried with great care in the sun. This is denominated *white ginger*. When less care is manifested, and the roots are scalded after being taken up, by which a portion of the aroma is dissipated, and then dried, *black ginger* is the result. Both kinds are imported in bags, containing about 100 pounds each.

Composition.—Volatile oil, on which its odour depends ; resino-extractive, which gives to it pungency ; starch, gum, sulphur, some saline matters, and lignin.

Properties and Uses.—Good ginger is firm, heavy, free from worm-holes, and breaking with a starchy fracture. It has a hot biting taste, and an aromatic odour. When its fracture is very fibrous, or short and resinous, or when the pieces are light and soft, it should be rejected.

Its virtues are extracted both by water and alcohol. Its action is that of a stimulant and carminative : it is therefore advocated in flatulent colic and debility of the stomach and intestines. As it does not produce the ill effects attributed to those spices whose virtues depend upon the presence of an acrid oil, it has been much employed. It rouses the vitality of the intes-

tinal surface generally, and renders it more susceptible of the influence of cathartics; hence the reason of the combination of ginger with most purgatives for the horse. It also increases the nervous energy of the stomach, and has found a place among the veterinary cordials, which it well deserves, for there is no carminative that can be brought into competition with it. It enters into the officinal compound of the College,

Cordial Mass.

Take of Root of Ginger, pulverized

Root of Gentian, do. of each equal parts,
which beat into a mass with treacle. Dose from $\mathfrak{z}\text{j}$
to $\mathfrak{z}\text{iss}$.

I believe this simple form will be found preferable to most of the more complicated ones which have been offered. There are those, however, who object to the use of stimulants or cordials, and conceive that the best are food, varying it so as to excite the appetite: nevertheless, at times a gentle provocative seems to be desirable. I need hardly add, that the indiscriminate use, and necessary abuse, of such agents should be abstained from.

PIMENTA BACCÆ, *Pimenta Berries*.

Common Names: Allspice, Jamaica Pepper.

I perceive I have neglected to introduce this agent in its proper place. It may not, however, be inappro-

priately considered here, as it ranks with the same class of substances as ginger.

Pimenta berries are the unripe seed-vessels of a tree growing in South America and the West India islands, particularly Jamaica. As soon as the seed-vessels are properly formed, they are gathered by the hand, and, being spread on cloths, are exposed to the action of the sun's rays, when they change from a green to a brown colour. A tree will sometimes yield 150 pounds of raw fruit, or 100 pounds when dry.

Composition.—Volatile oil, resin, extractive matter, tannin, and gallic acid.

Properties and Uses.—Pimenta berries have an aromatic and agreeable odour, resembling a mixture of spices; hence the name, *allspice*. Taste, warm and pungent. These qualities chiefly reside in the corticle covering, and are extracted by proof spirit. They should be chosen small and hard.

Medicinally, they may be regarded as a stimulant and tonic, and may be given in doses of from $\mathfrak{z}\text{ij}$ to $\mathfrak{z}\text{iv}$.

A tincture of pimenta, made by macerating for several days one pound of the bruised berries in six pints of proof spirit, has been strongly advocated by Mr. Bracy Clark as an antispasmodic. The dose is four ounces every hour, until relief is afforded.

INDEX.

A.		C.	
	<i>Page</i>		<i>Page</i>
Acid, Acetic	6	Camphor	68
— Arsenious	11	Cantharides	73
— Hydrochloric	16	— Liniment of	73
— Nitric.....	19	— Ointment of	70
— Sulphuric	23	— Vinegar of	73
Alcohol.....	166	Capsicum Berries	73
Alkanet Root	53	Caraway Seeds	74
Aloes, Barbadoes	30	Cascarilla Bark.....	75
— Cape	29	Catechu, Extract	77
— Solution of	36	Chalk, Prepared	81
— Compound Tincture of	39	Chamomile Flowers	54
Alum	39	Clysters	79
— Comp. Ointment of	42	Copper	85
— Comp. Powder of	41	— Acetate of.....	86
— Solution of.....	42	— Ointment of Acetate of	88
Ammonia	43	— Sulphate of	89
— Acetate Solution of	52	— — Liniment of	93
— Hydrochlorate of.....	45	— — Solution of	92
— Liniment of	49	Croton.....	82
— Sesqui-carbonate of.....	50	— Farina.....	83
— Solution of.....	48	— Oil of.....	83
Antimony	55	— Tincture of	84
— Hydrochlorate of.....	61		
— Potassio-tartrate of.....	57		
— Sesqui-sulphuret of	55		
B.		D.	
Black Oils	27	Deadly Nightshade	64
Bole, Armenian.....	65		
		F.	
		Fomentations	101
		Fox-glove	94

G.

	<i>Page</i>
Gentian Root.....	101
Ginger.....	182
Gum Arabic.....	5

H.

Hellebore, Black.....	102
— White.....	174
Hogs' Lard.....	28

I.

Iodine.....	116
— Liniment of.....	118
— Ointment of.....	118
— Tincture of.....	118
Iron.....	96
— Sulphate of.....	97

L.

Lead.....	136
— Acetate of.....	138
— Diacetate of.....	138
— Liniment of ..	142
— Solution of	142
Lime, Carbonate of.....	81
— Chlorinated.....	66
— Ointment of	68
— Solution of	67
Liniment, Ammonia.....	49
— Cantharides.....	73
— Copper, Sulphate of..	93
— Iodine, Compound ..	118
— Lead, Diacetate of..	142
— Soap, Compound ..	153
— Turpentine.....	172
— Compound.....	10

Page

Linseed.....	121
— Infusion of.....	123
— Meal of.....	122
— Oil of.....	122
Lotion, Discutient.....	48
— Refrigerant.....	47

M.

Magnesia, Sulphate of....	124
Mass, Alterative..	38
— Astringent.....	79
— Cathartic.....	35
— Common.....	123
— Cordial.....	183
— Diuretic.....	173
— Fever.....	61
— Tonic.....	91, 99
— Vermifuge.....	113
Mercury.....	105
— Bichloride of.....	107
— Solution of	109
— Chloride of.....	110
— Ointment of.....	114
— Compound.....	115
— Nitrate of	115
Myrrh.....	125
— Tincture of.....	126

N.

Naphtha, Rectified.....	11
-------------------------	----

O.

Ointment, Alum, Compound	42
— Cantharides.....	73
— Iodide of Potassium	120
— Iodine.....	118
— Lime, Chlorinated ..	67

	<i>Page</i>
Ointment of Mercury . . .	114
— — — Compound	115
— — — Nitrate of	115
Ointment, Tar	135
— Turpentine	170
— Verdigris	88
Olive Oil	123
Opium	128
— Tincture of	132

P.

Pitch	135
— Burgundy	132
Pimenta	183
— Tincture of	184
Potassa	144
— Carbonate of	146
— — — Impure	145
— Nitrate of	147
— — — Solution of	150
Potassium	143
— Iodide of	118
— — — Ointment of	120
Poultices	75

R.

Resin	172
Rye, spurred	153

S.

Salt	160
Saunders Wood	150
— Tincture of	150
Silver, Nitrate of	62
Soap	150

	<i>Page</i>
Soap, Hard	150
— Soft	151
— — — Liniment of	152
Soda, Carbonate of	157
— — — Impure	155
— Chloride of	158
— Sulphate of	158
Sodium	155
— Chloride of	160
Solution of Aloes	36
— Alum	42
— Ammonia	48
— — — Acetate of	52
— Copper, Sulphate of	92
— Lead, Diacetate of	142
— Lime, Chlorinated	68
— Mercury, Bichlor. of	109
— Potassa, Nitrate of	150
— Zinc, Sulphate of	180
Spirit, Nitric Æther	161
— Proof	166
— Pyroxilic	11
— Rectified	163
Sulphur	166
— Roll	167
— Sublimed	167
— Vivum	167

T.

Tar	133
— Oil of	10
— Ointment of	135
Tincture, Aloes, Compound	39
— Croton	84
— Iodine	118
— Myrrh	126
— Opium	132
— Pimenta	184
— Saunders Wood	150

	<i>Page</i>	<i>Z.</i>	<i>Page</i>
Turpentine.....	168	Zinc.....	176
—— Common.....	169	—— Carbonate of	177
—— Liniment of.....	172	—— Chloride of.....	181
———— Compound	10	—— Oxide of	177
—— Oil of	170	—— Sulphate of.....	178
—— Ointment of.....	170	———— Solution of ...	180



123

