four scruples; distilled water, *twenty ounces*. Dissolve. Mix the salts separately in ten ounces of the water; then mix the solutions, and after the precipitate subsides, filter."

Syn. Dissolution d'Acetate de Zinc (*F.*). Liquore de l'Acetato di Zinco (*I.*).

In this process a double decomposition takes place: the sulphuric acid of the sulphate of zinc unites with the oxide of lead of the acetate of lead, whilst its acid combines with the disengaged oxide of zinc. The former salt being insoluble, is precipitated in the form of a heavy, white powder, but the acetate of zinc remains dissolved; and thus its solution, which is colourless and limpid, is easily separated by filtration.

Medical properties and uses. — This solution is astringent; and was long employed before it was introduced into the Pharmacopœia, and even before its nature was clearly understood. It is an useful collyrium in chronic ophthalmia, and in the acute variety of this disease, after the inflamed vessels are unloaded, and the inflammatory action subdued. It is also an useful injection in the advanced stage of gonorrhœa.

TINCTURA ACETATIS ZINCI, Dub. *Tincture of Acetate of Zinc.*

"Take of sulphate of zinc, acetate of potassa, of each, *one part*. Rub them together, and add of rectified spirit of wine, *sixteen parts*. Macerate for a week, with occasional agitation, and filter through paper."

In this process, a double decomposition also takes place, acetate of zinc and sulphate of potassa being produced; the former of which is dissolved in the spirit, while the latter remains undissolved, and, therefore, is easily separated. It is a tedious process, and possesses no advantages over the former to recommend it.

Medical properties and uses. — This tincture is astringent; but requires to be diluted with water, before it can be used either as a collyrium or an injection. It might be advantageously employed as an internal remedy in dyspepsia, and other debilities of the stomach.

PREPARATIONS OF SULPHUR.

PURE SULPHUR is generally regarded a simple substance; but, according to Sir H. Davy's experiments, it is a triple compound of oxygen, hydrogen, and a peculiar, unknown base. It unites readily with metals, some oxides, earths, and the fixed alkalies, forming compounds which have been denominated *Sulphurets*. These are formed by the fusion of the substances in a dry state; and the compounds require to be

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carefully preserved from the atmosphere, as they attract moisture from it, deliquesce, and are decomposed. When, however, the union of sulphur and alkaline or earthy bases is effected by means of water, the products are not simple *sulphurets*, but sulphurets combined with sulphureted hydrogen, and have been named *Hydrogureted Sulphurets*. They are equally susceptible of decomposition by exposure to the air as the sulphurets.

OLEUM SULPHURETUM[1], Lond. *Sulphureted Oil.*

"Take of washed sulphur, *two ounces;* olive oil, *a pint.* Add the sulphur gradually to the oil heated in a very large iron pot, and stir the mixture after each addition till they have united."

Edinburgh.

"Take of olive oil, *eight parts;* sublimed sulphur, *one part.* Boil them with a gentle heat in a large iron vessel, stirring constantly, until they unite."

Syn. Huile sulphur (*F.*), Oleo sulfurato (*I.*).

Sulphur is soluble in many fixed oils, but particularly so in linseed oil. This combination was formerly termed a *balsam*, and was sometimes united with other substances; as, for instance, the oil of aniseed, in forming the *anisated balsam of sulphur*. Great attention is required in these processes to prevent the mixture from boiling over, or its vapour from catching fire. If either of these accidents occur, the combustion may be stopped, by instantly covering the pot with a close lid. The iron pot should be sufficient to contain thrice the bulk of the ingredients.

Qualities. — The odour of this solution of sulphur is extremely fœtid, and the taste acrid. It is of a reddish-brown colour; has a thick, viscid consistence; and, when heated, emits sulphureted hydrogen. When it is much concentrated, the sulphur crystallizes in octahedrons.

Medical properties and uses. — Sulphureted oil is stimulant, and externally detergent. It was formerly, when regarded as balsamic, recommended in catarrh, asthma, and phthisical affections; but its internal use is now properly exploded. It is sometimes still externally applied for cleansing foul ulcers. The dose was from ♏ v. to ♏ xxx. taken in water.

POTASSÆ SULPHURETUM[2], Lond. *Sulphuret of Potassa.*

"Take of washed sulphur, *an ounce;* subcarbonate of potassa, *two ounces.* Rub them together, and place the mixture over the fire in a covered crucible until they unite."

SULPHURETUM POTASSÆ, Edin.

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[1] Balsamum Sulphuris simplex, P. L. 1745. [2] Kali Sulphuratum, P. L. 1787.

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"Take of subcarbonate of potassa, *two parts;* sublimed sulphur, *one part*. Rub them together, and put them into a large, covered crucible, to which, having adapted a cover, apply the fire cautiously, until they melt. Preserve the mass in a well-closed vessel."

SULPHURETUM POTASSÆ, Dub. *Sulphuret of Potassa.*

"Take of carbonate of potassa, *four parts;* sublimed sulphur, *one part*. Having mixed them together, put them into a crucible, and having adapted to it a cover, expose it to a fire gradually raised until they unite."

Syn. Sulphure de Potasse (*F.*), Schwelflichtes Kali (*G.*), Solfuro di Potassa (*I.*).

This sulphuret cannot be properly formed by following the directions of any of the Colleges; for, to render the combination complete, it is necessary to expose the subcarbonate in a crucible to a red heat, previously to its being rubbed with the sulphur: the water of the subcarbonate is thus dissipated, and at the same time a portion of the carbonic acid is expelled, both of which, when not driven off, alter the product. When the fusion is effected, the mixture is to be poured upon a marble slab, and, as soon as it concretes, the mass must be broken in pieces and preserved in a closely-stopped bottle. In this process the potassa, after the carbonic acid is totally expelled, is partly decomposed, and the oxygen of that portion combining with a portion of the sulphur forms sulphuric acid, which combines with the undecomposed portion of the potassa, and forms sulphate of potassa. The remainder of the sulphur combines with the potassium or metallic base of the potassa, and forms a sulphuret: thus making the result of the process a compound of sulphate of potassa and sulphuret of potassium [1], with perhaps an excess of sulphur; varying in different proportions. The proportion of the carbonate of potassa ordered by the Dublin College is too large.

Qualities. — Well prepared sulphuret of potassa, as this preparation is erroneously termed, is inodorous while dry; but when moistened or dissolved in water, a partial decomposition of both the water and the sulphuret is effected, and sulphureted hydrogen is formed. It has an acrid, bitter taste; changes the vegetable blues to green; is hard, brittle, breaking with a glassy fracture, of a liver-brown colour, and stains the skin brown.[2] By exposure to the air it attracts moisture; its colour changes to a pale green; the fœtid odour

[1] A simple or monosulphuret is formed by decomposing sulphate of potassa by means of a high temperature, in a crucible lined with a charcoal lute, the vacant space being filled with charcoal rammed hard, and the cover luted on. The oxygen of both the potassa and of the sulphuric acid is carried of by the carbon, whilst the sulphur and the potassium remain in combination as a sulphuret.

[2] Hence its old name, *hepar sulphuris.*

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noticed above is emitted; and it is gradually converted into hydrogureted sulphuret of potassa, combined with a small portion of sulphate of potassa. It is also decomposed by all the acids which combine with the potassium, and the sulphur is precipitated. In a violent heat the sulphur sublimes, leaving the potassa.

Medical properties and uses. — Sulphuret of potassa is expectorant and diaphoretic. It has been frequently given in chronic asthma and chronic catarrh, without much benefit; but has been found useful in arthritic, rheumatic, and herpetic affections; and in combination with conium as a palliative in cancerous cases.[1] It has also been employed in France, for the cure of scabies, in the form of a bath, or of an ointment made with one part of the sulphuret, sixteen of soap, and thirty-two of oil. From a theory founded on its chemical action on metallic salts out of the body, it has also been strongly recommended as an antidote against arsenical, saturnine, and mercurial preparations, when these have been taken in doses sufficient to produce deleterious effects; but it has, hitherto, been too seldom employed to ascertain its real value in these cases.

The usual dose is grs. ij., or grs. iv. combined with soap, in the form of pills, for the first-mentioned cases; or from grs. v. to grs. x. as an adjunct to conium in cancer, given several times a day.

SULPHUR LOTUM, Lond. *Washed Sulphur.*[2]

"Take of sublimed sulphur, *a pound.* Pour upon it boiling water, that the acid, if there be any, may be entirely washed away; then dry it."

SULPHUR SUBLIMATUM LOTUM, Edin. *Washed sublimed Sulphur.*

"Take of sublimed sulphur, *one part;* water, *four parts.* Boil the sulphur for a short time in the water; then pour off this water, and by repeated affusions of cold water, wash away all the acid; lastly, dry the sulphur."

Dublin.

"Let warm water be poured upon sublimed sulphur, and the washing be repeated as long as the water employed shall appear acid. This is known by means of litmus. Dry the sulphur on bibulous paper."

Syn. Soufre lavé (*F.*), Geevaschner Schwefel (*G.*), Zolfo lavato (*I.*).

In subliming sulphur, a small portion of it is apt to be acidified by attracting the oxygen of the heated air of the vessels, or the chamber in which the process is conducted. The quantity is, however, very minute, and is completely removed by the above processes. The sulphur does not afterwards undergo

[1] *Pearson's Practical Synopsis, &c.* i. 283. [2] Flores sulphuris loti, P. L. 1787.

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any change from exposure to the air at the ordinary temperature of the atmosphere.

SULPHUR PRÆCIPITATUM, Lond. *Precipitated Sulphur.*[1]

"Take of sublimed sulphur, *a pound;* fresh burnt lime, *two pounds;* water, *four gallons.* Boil the sulphur and the lime together in the water; then filter the liquor through paper, and drop into it as much muriatic acid as may be sufficient to precipitate the sulphur. Finally, wash this with repeated affusions of water, until it become tasteless."

Syn. Soufre précipité (*F.*), Schwefel niederschalg (*G.*). Zolfo Precipitato (*I.*).

In the first part of this process, a hydrogureted sulphuret of lime is produced, by the combination of the lime and sulphur occasioning a decomposition of a part of the water, the hydrogen of which unites with a portion of the sulphur, and forms a hydrosulphuret; while the oxygen with another portion forms sulphuric acid that combines with part of the lime; and thus the solution contains a small portion of sulphate of lime, and a sulphuret of lime or rather the base of lime, *calcium*, combined with sulphureted hydrogen. This hydrogureted sulphuret is then decomposed by the muriatic acid, which unites with the lime, and forms a soluble muriate, while the sulphur is precipitated, and sulphureted hydrogen gas disengaged.

Qualities. — Precipitated sulphur is white, with a very slight greenish tinge. When heated in a retort in a low heat, it acquires the colour of common sulphur, and water is deposited in the beak of the retort; from which circumstance, and the same degree of whiteness being produced when sulphur is sublimed into a vessel filled with steam, there is reason for supposing that precipitated sulphur owes its whiteness to the presence of a little water. It differs in no other respect from sublimed sulphur, and is an unnecessary refinement for the sake of appearance in the composition of ointments.

POTASSÆ SULPHURETI AQUA, Dub. *Water of Sulphuret of Potassa.*

"Take of sublimed sulphur, *one part;* water of caustic potassa, *eleven parts.* Boil them together for ten minutes, and filter through paper. Preserve the preparation in well-stopped phials. The specific gravity of this liquor is, to that of distilled water, as 1117 to 1000."

Syn. Liquore di solfuro di Potassa (*I.*).

The name given to this preparation conveys an erroneous idea of its nature. When an alkaline sulphuret is dissolved in water, changes exactly similar to those we have mentioned (*Sulphur præcipitatum*) as taking place during the solution of an earthy sulphuret occur, altering the character of the pro-

[1] Lac sulphuris, P. L. 1720. Sulphur precipitatum, P. L. 1787.

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duct; and as the same happen by the direct combination of sulphur with a liquid alkali, this preparation is not a simple aqueous solution of sulphuret of potassa, but, in fact, a solution of *hydrogureted sulphuret of potassa*, or sulphuret of potassa combined with sulphureted hydrogen.[1]

Qualities. — This solution has a slightly fetid odour, and a nauseous, acrid, bitter taste. Its colour is reddish yellow, approaching to deep orange; its feel soapy; and it stains the cuticle a greenish black. Acids decompose it, precipitating the sulphur, and disengaging a portion of sulphureted hydrogen gas; and it is also decomposed by exposure to the air, the oxygen of which being absorbed by the sulphur forms sulphuric acid, which produces a sulphate with the potassa; so that in process of time the whole is changed into a solution of sulphate of potassa. Hence the necessity of preserving it in well-stopped phials.

Medical properties and uses. — This solution does not differ in its medicinal properties from the solid sulphuret of potassa. It is, however, chiefly employed as an external application; and as such has been found very beneficial in porrigo, scabies, and herpetic eruptions. When given internally, the dose is from ♏xx. to ℥iss. twice a day.

HYDROSULPHURETUM AMMONIÆ, Edin. *Hydrosulphuret of Ammonia.*

"Take of water of ammonia, sulphuret of iron, of each, *four ounces;* muriatic acid, *eight ounces;* water, *two pounds and a half.* Pour the acid, previously mixed with the water, on the sulphuret, and transmit the gas evolved, through the water of ammonia. Preserve the solution in well-stopped phials."

SULPHURETUM FERRI, Dub. *Sulphuret of Iron.*

"Heat a bar of iron in a powerful fire, excited by bellows, and rub it upon a roll of solid sulphur. Let the sulphuret of iron drop into water, and having separated it from the sulphur, let it be dried and kept in a closely-stopped bottle."

AMMONIÆ HYDROSULPHURETUM, Dub. *Hydrosulphuret of Ammonia.*

"Take of sulphuret of iron in coarse powder, *five parts;* sulphuric acid, *seven parts;* water, *thirty parts;* water of caustic ammonia, *four parts.* Put the sulphuret into a retort, and gradually pour over it the acid diluted with water; and in a proper apparatus transmit the gas evolved from it through water of ammonia. Toward the conclusion of the operation apply a moderate heat to the matrass."

The proportions of the ingredients ordered in the Dublin

[1] It was formerly denominated *liquid hepar,* or *liquid liver of sulphur.*

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formula for producing the sulphuret of iron enable them to unite at a low heat; and the combination is attended with a brilliant ignition, which takes place without the presence of air. The compound is of a grey colour intermixed with yellow, and resembles bronze; has a metallic lustre, and a crystalline texture, with a considerable degree of brittleness, and when pulverized yields a black powder. According to Proust, 100 parts of it consist of 62·5 of iron, and 37·5 of sulphur.[1] The addition of the diluted muriatic acid, by oxidizing the iron, enables it to decompose the water, the hydrogen of which dissolving a part of the sulphur escapes, in the form of sulphureted hydrogen gas, which combines at a low temperature with the ammonia of the solution through which it is made to pass. Mr. Cruikshank[2] advises the sulphuret of iron to be prepared "by raising a piece of iron in a smith's forge to a white heat, and then rubbing it against the end of a roll of sulphur; the iron at this temperature immediately combines with the sulphur, and forms globules of pyrites (*sulphuret*), which should be received into a vessel filled with water: these globules are to be reduced to powder, and introduced into the proof, to which a sufficient quantity of the muriatic acid is to be added." Various other modes have been also recommended for the preparation of the sulphuret; but the process directed by the Dublin College is easy and perfectly adequate for the purpose.

Qualities. — Hydrosulphuret of ammonia is of a dark green colour; has a very fetid odour, and an acrid, disagreeable taste. It is decomposed by the acids.

Medical properties and uses. — This preparation is a powerful sedative, lessening the action of the stomach, and of the arterial system in a remarkable degree; and even in moderate doses producing sickness, vomiting, and vertigo. It was first proposed as a remedy by Mr. Cruikshank, with the view of diminishing the morbid appetite and powerful action of the digestive organs, which attend those labouring under diabetes mellitus; and its subsequent use has been confined to the treatment of that disease. The dose to an adult should not at first exceed ♏ v. or ♏ vj. given in a large tumbler of water, three or four times a day; and the number of drops should be gradually increased, until a slight degree of giddiness takes place, when any further increase must be stopped.

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[1] *Journal de Physique*, liii. 89.
[2] *Rollo on Diabetes and Lues Venerea.*

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