By this process tin is reduced to the form of a fine granular powder, and, perhaps, by the constant stirring, it is also very slightly oxidized, for the powder has less brilliancy than the entire metal.

Medical properties and uses. — Powder of tin is a mechanical anthelmintic. It has been chiefly given in tænia; and is supposed to operate by the grittiness of its particles irritating the worm, and dislodging it from the mucus in which it is imbeded. It is given in doses of ʒj. or ʒij. mixed in treacle, for two or three successive mornings, and a brisk cathartic afterwards exhibited. But it is likely to be, henceforth, seldom used, oil of turpentine being a much superior remedy for the expulsion of tænia.

PRÆPARATA E PLUMBO.

PREPARATIONS OF LEAD.

LI'QUOR PLUM'BI SUBACETA'TIS. Lond. *Solution of Subacetate of Lead.*[1]

"Take of semi-vitrified oxide of lead, *two pounds*; acetic acid (distilled vinegar), *a gallon.* Mix them, and boil down to six pints, assiduously stirring; then set the solution aside, that the impurities may subside, and strain it."

LIQUOR SUBACETATIS LITHARGYRI. *Dub. Solution of Subacetate of Lead.*

"Take of litharge, *a pound*; distilled vinegar, *eight pints.* Put them into a glass vessel, and boil to six pints, assiduously stirring; then set the solution aside, and strain it after the fæces have subsided."

In these processes, the acetic acid, which the distilled vinegar contains in a highly diluted state, attracts a portion of the oxide of lead, and forms an acetate, which remains dissolved in the water. The two Colleges err in naming it a subacetate. The proportion of litharge ordered in both formulæ is too large, a gallon of distilled vinegar of the specific gravity 1·007 being capable of dissolving ten ounces only of the oxide.

Qualities. — This solution of acetate of lead, when properly prepared with pure distilled vinegar, is of a greenish straw-colour, has a slight acetous odour, and an austere somewhat sweetish taste. It is partially decomposed when largely di-

[1] Aqua lithargyri acetati, P. L. 1787. Acetate de Plomb liquide (*F.*) Blaiwasser (*G.*) Aceto di Saturno (*I.*)

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luted with distilled water; and with pump water, a heavy precipitate instantly takes place: it is also precipitated in the form of a white sub-salt by the alkalies and their carbonates; and a black precipitate is produced by the alkaline sulphurets. This solution is also incompatible with solutions of mucilage, the gum of which it coagulates; and, indeed, it is the most delicate test for mucilage with which we are acquainted. According to the experiments of Dr. Bostock [1], the constituents of 100 parts of the saturated solution are 23·1 of oxide of lead, 5 of acetic acid, and 71·9 of water, which agree with the statement of Thenard[2], who found that the salt, when crystallized, consists of 17 parts of acid, 78 of oxide of lead, and 5 of water, in 100 parts. [3]

Medical properties and uses. — This solution is used only externally, and when diluted with water forms a very useful cooling, discutient application to phlegmonous inflammations and burns. It was introduced into practice by M. Goulard, a surgeon of Montpelier; and hence was long distinguished by the appellation of Goulard's Extract.

LI'QUOR PLUM'BI SUBACETA'TIS DILU'TUS. Lond. *Diluted Solution of Subacetate of Lead.*[4]

"Take solution of subacetate of lead, *a fluid drachm;* distilled water, *a pint;* proof spirit, *a fluid drachm.* Mix."

LIQUOR SUBACETATIS LITHARGYRI COMPOSITUS. Dub. *Compound Solution of Subacetate of Litharge.*

The same as the London formula, with double the quantity of each of the ingredients.

This preparation, as an article in the pharmacopœia, is superfluous, every surgeon being in the habit of ordering lotions with different proportions of the solution of acetate of lead, according to the circumstances of the case.

PLUM'BI SUPERACE'TAS. Lond. *Superacetate of Lead.*[5]

"Take of carbonate of lead, *a pound;* acetic acid (distilled vinegar), *a gallon and a half.* Boil the carbonate of lead with the acid until this is saturated; then filter the solution through paper, and, having evaporated it until a pellicle appears on its

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[1] *Nicholson's Journal*, xi. 75. [2] Ibid. vi. 223.

[3] The nature of the salt in this solution was first pointed out by Scheele, who changed a solution of the superacetate of lead into Goulard's extract, by keeping it in a plate of lead for the space of a day; but this experiment was over-looked until Dr. Bostock's analysis of the preparation. An excellent mode of preparing it is employed in the French Hospitals. Three parts of superacetate of lead is dissolved in a sufficient quantity of hot distilled water, and to the solution one part of semi-vitreous oxide of lead is added, in fine powder. The whole is then evaporated until it marks 28° of Beaumè's areometer; and when cold filtered. Vide *Journ. de Pharm. Dec.* 1876. p. 565.

[4] Aqua lithargyri acetati composita, P. L. 1787.

[5] Saccharum saturni, P. L. 1720—45. Cerussa acetata, P. L. 1787. Acetate de Plomb cristallisé (*F.*) Essigsaures Blei (*G.*) Zucchero di Saturno (*I.*)

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surface, set it apart that crystals may form. Pour off the fluid, and dry the crystals upon bibulous paper."

ACETAS PLUMBI. Edin. *Acetate of Lead.*

"Take of white oxide of lead, *any quantity*; weaker acetic acid, *a sufficient quantity*. Put the oxide into a cucurbit, and pour over it ten times its weight of the acid. Let the mixture stand upon a warm sand-bath until the acid becomes sweet; then let this be poured off, and add fresh portions of acid successively, until no more sweetness is communicated. Evaporate all the fluid, freed from impurities, in a glass vessel to the consistence of thin honey, and set it aside in a cold place that crystals may form, which are to be dried in the shade. Evaporate again the residuary liquor, that new crystals may be obtained; and repeat the evaporation until no more are formed."

ACETAS PLUMBI. Dub. *Acetate of Lead.*

"Take of subacetate of lead, called CERUSSA, *any quantity*, distilled vinegar, *ten times its weight*. Digest them in a glass vessel until the vinegar becomes sweet; and having poured this off, add more, until it ceases to become sweet. Filter the solution, and crystallize by alternate slow evaporation and cooling. Dry the crystals in the shade."

In these processes the acetic acid of the distilled vinegar unites with the oxide of lead of the carbonate; and by the subsequent evaporations the salt crystallizes in the form of an acetate. But on account of the smallness of the quantity of product, the trouble and expence of the process, and the difficulty of obtaining the white lead perfectly free from whitening (carbonate of lime), with which it is generally adulterated, the preparation of this salt is seldom undertaken by the apothecary; so that the superacetate usually found in the shops is the salt which is manufactured on a large scale, for the use of the calico-printers, purified. It is chiefly prepared in Holland, in the following manner: Sheets of lead, coiled up, are put into pots, in which they are half immersed in distilled vinegar, and digested a sufficient time. Before long the upper half, or that which is not immersed, is covered with an efflorescence of cerusse, after which it is immersed in the vinegar, and the part which was before immersed is now brought up to be converted into cerusse as before, when the plate is again turned; and this is repeated two or three times a day, until the vinegar becomes milky. This solution is next boiled in tinned vessels down to about one-third of the original quantity, then strained, and the salt crystallized by slow cooling. The crystals obtained by a second evaporation

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of the mother-water are browner, and deliquescent[1]: and as these are generally mixed with the others, the whole requires to be again dissolved in rain or distilled water, and re-crystallized, before they are fit for medicinal purposes.

Qualities.—This salt, when pure, is inodorous, has a sweet, astringent taste, and crystallizes in white glossy, acicular, flat, four-sided prisms, terminated by dihedral summits, which are generally aggregated into irregular masses that have the appearance of lumps of sugar. Its specific gravity is 2·35.[2] Acetate of lead slightly effloresces, is soluble in 25 parts of distilled water either hot or cold; but after standing for some time a slight decomposition takes place, and a small portion of white powder is deposited, which is an insoluble carbonate. It is also soluble in alcohol. In pump or hard water it is instantly decomposed, forming a milky solution, and a copious precipitate falls. It is decomposed by the alkalies and their carbonates, most of the acids, and neutral salts, lime, and magnesia; but it does not affect a solution of gum. According to the analysis of Thenard, the constituents of 100 parts are 58 of oxide of lead, 26 of acid, and 16 of water.[3]

Medical properties and uses.—Taken internally, superacetate of lead is a very powerful astringent, and sedative. It requires to be exhibited, however, with caution, and is admissible only in cases of very urgent danger, as in violent pulmonary and intestinal hæmorrhages, in restraining which it has a very powerful influence. Combining it with opium prevents the deleterious effects which salts of lead are apt to produce when taken into the stomach; but, even when so combined, the smallest dose, in certain habits, is productive of very serious mischief. Some years ago, Dr. Hildebrand of Lemberg tried this salt in combination with opium with seeming advantage in phthisis; and it has been since occasionally used in this country; but from the effects of it in that disease, as far as I have observed, it is not likely to be generally employed by British practitioners. Dissolved in a large proportion of water, it forms an excellent collyrium in ophthalmia; and somewhat less diluted, its solution is in common use as an external application in superficial inflammation. Objections have, nevertheless, been raised to the long-continued external use of the preparations of lead; but the daily extensive employment of them in this form, without any bad effects, is a sufficient proof that, if they occasionally have produced mis-

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[1] *Aikin's Dictionary of Chemistry*, ii. 26. [2] Hassenfratz.
[3] *Nicholson's Journal*, vi. 223.

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chief, it is rather to be attributed to some peculiar idiosyncracy, than to the nature of the remedy.

The dose of superacetate of lead, when internally exhibited, should not exceed gr. ss. given every six or eight hours. It may be made into a pill with crumb of bread, and a proportion of opium, according to the circumstances of the case. As a collyrium or lotion, the proportions may be from gr. x. to ℈j. of the salt in f℥viij of distilled water. The addition of a small quantity of distilled vinegar is necessary to prevent decomposition, when distilled water is not employed.

Officinal preparation. *Ceratum Plumbi Superacetatis.* L. E. D.

PRÆPARATA E ZINCO.

PREPARATIONS OF ZINC.

CALAMINA PRÆPARATA. Lond.[1] *Prepared Calamine.*

"Burn the calamine, and beat it to powder; then bring it into the state of a very fine powder, in the manner directed for the preparation of chalk."

CARBONAS ZINCI IMPURUS PRÆPARATUS. E. *Prepared impure Carbonate of Zinc.*

"Impure carbonate of zinc, roasted by those who make brass, being rubbed to powder in an iron mortar, and levigated with a little water in a porphyry, is to be put into a large vessel, and water poured over it, which after frequently agitating the vessel, is to be poured off loaded with the powder. The fine powder which subsides after the water has remained at rest, is then to be dried. The coarse, which the water cannot suspend, is to be again levigated, and treated as before."

LAPIS CALAMINARIS PRÆPARATUS. Dub. *Prepared Calamine Stone.*

"Reduce calcined calamine stone to powder, and separate the very fine parts in manner directed for the preparation of chalk."

The nature of this ore of zinc has been already stated. (*Part* ii.) As it is frequently used in the form of a dry powder to excoriations, ichorous ulcers, and superficial inflamma-

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[1] Calamine preparé (*F.*) Galmei (*G.*) Calamina (*I.*)