Officinal preparations. *Magnesia*, L. E. D. *Hydrargyrum cum Magnesia*, D.

APPENDIX TO THE ALKALINE AND EARTHY SALTS.

I.—Hydriodas Potassæ.

Hydriodate of Potass.

In noticing this substance, which, although it have not been admitted into any of the British Pharmacopœias, yet has been extensively used, I will take the opportunity of describing Iodine, the combination of which with Hydrogen forms the Hydriodic acid, the acid base of the Hydriodate.

Iodine is procured by first lixiviating powdered kelp with cold water; then evaporating the ley till a pellicle form, and setting it aside to crystallize. On separating the crystals, the mother water is to be evaporated to dryness, and to the mass, put into the flask of an alembic, is to be added half its weight of sulphuric acid, and the same weight of black oxide of manganese; and, after adapting a capital and receiver to the flask, the mixture is to be distilled with a gentle heat, as long as violet vapours arise, which condense chiefly in the capital, in the form of opaque crystals, with a metallic lustre. These are Iodine. Various other methods have been employed for procuring Iodine, the best is the following, proposed by Dr. Ure. Take eight fluid ounces of the brown liquid, which drains from the salt which the soap-makers, who employ kelp, boil up and evaporate to dryness, heat it to 230° Fahrenheit, and add one fluid ounce of sulphuric acid diluted with its own bulk of water. When the mixture cools, separate the crystals of the salts [1], which will form in it by filtration through a woollen cloth, and add to the fluid poured into a mattress, 830 grains of black oxide of manganese in powder. A glass globe is then to be inverted over the mouth of the mattress, and the heat of a charcoal chaffer being applied, Iodine will sublime in great abundance. It must be washed out of the globe with alcohol, then drained and dried on plates of glass; and purified by a second sublimation from dry quicklime. [2]

Iodine has been procured from sponge by M. Straub of Hofwyl [3]; and from various sea plants; for instance, Fucus *saccharinus*,—*digitatus*,—*serratus*,—*vesiculosus*,—*siliquosis*,—*filum*,—*rubens*,—*cartilagineus*,—*membranaceus*, and—*filamentosus*; Ulva *pavonia*, and U. *linza*. Its presence in plants is detected by mixing with their aqueous infusions, starch and sulphuric acid, and then adding a small quantity of aqueous solution of chlorine. At the place where the fluids touch will be perceived a blue zone, which becomes more visible if the vessel be slightly agitated; but disappears if the whole be mixed. [4]

The discovery of Iodine is due to M. Courtais, a French chemist, who first obtained it in 1811; but its nature was not known to the philosophical world till 1813, when it was announced to the French Institute by M. Clement. Its properties and chemical affinities were afterwards determined by the experiments of Gay Lussac [5], Sir. H. Davy [6], Vauquelin [7], Colin, Gaulthier de Claubry [8], and M. Pelletier. [9]

Qualities. — Iodine, when properly prepared, is a crystallized substance of a greyish black colour, having a specific gravity of 4·946, and a metallic lustre: its smell is disagreeable, not unlike that of chlorine, and its taste acrid and hot. It

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[1] These are sulphate of soda, sulphate of potass, hydriodate of soda and sulphur.
[2] *Phil. Magazine*, 1. p. 161.
[3] *Journ. of Science and the Arts*, vol. x. p. 456. [4] *Ann. de Chimie*, xxviii. p. 179.
[5] Gay Lussac's Experiments were published in November 1813. Vide *Ann. de Chim.* t. lxxxviii. p. 319.
[6] Sir H. Davy's Experiments were published in December 1813.
[7] *Ann. de Chimie.* t. xci. [8] *Journ de Phys.* Aout. 1814.
[9] *Bulletin de Pharmacie*, t. vi.

is usually obtained in romboidal plates, which show a lamellated fracture; are scarcely soluble in water, but more so in alcohol, and still more in sulphuric ether. It melts at 224° Fahrenheit, and is volatilized at a temperature between 347° and 356°. Its vapour is of a beautiful violet colour, (whence its name from ἰωδὴς violet). It changes vegetable colours to yellow: is sparingly soluble in water; is soluble in alcohol; and when combined with hydrogen, forms an acid, the Hydriodic. It is sometimes adulterated with coal, but this is easily detected by alcohol, in which pure Iodine is completely soluble.

Medicinal Properties. — From the fact that burnt sponge forms the basis of all the remedies that have been productive of any benefit in the treatment of bronchocele, Dr. Coindet of Geneva, supposing that Iodine was the active principle of the sponge, proposed to employ it in different combinations for the cure of that disease. He gave it in the form of tincture, made by dissolving forty-eight grains of Iodine in a fluid ounce of alcohol; and, also, in the form of hydriodate of potass.

The *Hydriodate of Potass* is made by dissolving Iodine in a solution of pure potass. Both an iodate and a hydriodate are formed; the first of which being much less soluble than the second, falls to the bottom of the solution in the form of small grains; the second (the hydriodate) remains dissolved in the liquid, which assumes a bright-yellow colour if the Iodine be not in excess, but a deep, brownish-yellow, if it be in excess. Numerous cases of the beneficial results of the exhibition of both these preparations of Iodine in bronchocele and in scrophulous swellings, have been published by Dr. Coindet and others: but, in this country, the remedy has been too little used to determine its real value.

The Hydriodate of Potass is the form of the medicine now generally preferred. Professor G. Taddei (*Gionale di Fisica Chim.* &c. Dec. 11. Tome iv. p. 81. Pavia, 1823.) gives the following formula for its preparation. Dissolve Iodine in Alcohol, and add to the tincture some Hydrosulphate of Potass; the fluid becomes first turbid, then assumes a deep red passing to flesh colour, and finally becomes white, like milk. If the addition of some drops of hydrosulphate of potass do not produce turbidness, the operation is complete: after a time the sulphur, which gives it the white colour, falls in flakes to the bottom, and may be separated by decantation or filtration. Distil the solution to regain the alcohol employed in the process, and the residue to dryness to obtain the *Hydriodate of Potass.*

Much caution is requisite in the administration of Iodine. In delicate, nervous habits, it is apt to bring on palpitations, dry cough, tremors, especially of the arms, and other febrile symptoms; and occasionally diarrhœa and priapism. M. Hufeland has recorded an instance of the use of the Tincture of Iodine for six months completely obliterating the mamma of a young healthy female of twenty years of age. What would be the result of its use in cancer of the mamma? [1] Professor Ullman, of Marburg, has published several cases of cancerous ulcer, which he treated successfully by the application of Hydriodate of Potass, used both as an ointment and a lotion.

The dose of the Tincture of Iodine is from ten to fifteen drops for an adult, given in a glassful of sugared water, or of syrup of capillaire and water, three times a day[2], and of that of the Hydriodate, from six to ten drops, in the same vehicle.

Besides the use of Iodine as a curative agent, it has been employed as a test of the presence of *oxide of arsenic* and of *corrosive sublimate.* Brugnatelli, who first proposed its employment for this purpose, directs as much Iodine to be added to recently boiled starch as will give it a blue colour, and then as much distilled water to be mixed with this coloured starch as will bring it to the state of an aqueous solution. A few drops of an aqueous solution of oxide of arsenic added to this solution, changes its colour at first to a reddish hue, which gradually disappears, leaving the mixture colourless; but the blue colour is restored by the addition of a few drops of sulphuric acid. The same effects, with the exception of the restoration of the blue colour by the acid, are produced by Iodine on a solution of corrosive sublimate. [3]

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[1] *Journ. de Hufeland*, June 1824.

[2] The Tincture has been successfully used in leucorrhœa by Dr. Sublairoles. See *Journ. Univers. des Sciences Med.* Oct. 1823. p. 124.

[3] *Giorn. di Fisica.* ix. p. 465.

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No. 2.

TABLE presenting a synoptical View of the Neutral Salts with Alkaline and Earthy Bases, employed as remedies, or for pharmaceutical purposes[1], retaining the Names in the British Pharmacopœias.

Salts.	Taste.	Figure of Crystals.	Action of Air.	Solubility in 100 parts of Water.		Action of Heat.
				at 60°	at 212	
Sulphate of Barytes	None	Rhomboidal prisms	None	0	0·002	Decrepitates.
——— Potass	Bitter	Six-sided prisms	None	6·25	24	Decrepitates.
——— Soda	Bitter	Six-sided prisms	Effloresces	35	125	Watery fusion.
——— Magnesia	Bitter	Four-sided prisms	None	100	133	Watery fusion.
Alum	Astringent	Octahedrons	Little	20	33	Watery fusion.
Nitrate of Potass	Cooling	Six-sided prisms	None	14·3	100	Fuses.
Muriate of Barytes	Astringent	Four-sided prisms	None	20	30	Decrepitates.
——— Soda	Salt	Cubes	None	35·46	36·16	Decrepitates.
——— Lime	Bitter	Six-sided prisms	Deliquesces	400		Watery fusion.
——— Ammonia	Acrid	Four-sided pyramids	Subdeliquesces	31	50	Sublimes.
——— Magnesia	Bitter	Needles	Deliquesces	151		Watery fusion.
Hyperoxymuriate of Potass	Cooling	Rhomboidal plates	None	6	40	Gives out oxygen.
Phosphate of Lime	None	Six-sided prisms	None	0	0	Vitrifies.
——— Soda	Salt	Rhomboidal prisms	Effloresces	25	50	Watery fusion.
Borax	Styptic	Six-sided prisms	Effloresces	0·025	16·8	Watery fusion.
Carbonate of Barytes	None	Rhomboidal prisms	None		0·043	Little.
——— Lime	None	Various	None	0	0	Decrepitates.
——— Potass	Alkaline	Four-sided prisms	None	25	83⅓	Watery fusion.
——— Soda	Alkaline	Octahedral truncated	Effloresces	50	100+	Watery fusion.
——— Magnesia	None	Six-sided prisms	Effloresces	2		Decrepitates.
——— Ammonia	Urinous	Irregular	None	50+	100	Evaporates.
Acetate of Potass	Hot	Plates	Deliquesces	99		Melts.
——— Ammonia	Cool	Slender prisms	Deliquesces	Very soluble		Melts and sublimes.
Tartar	Acid	Irregular prisms	None	1	3⅓	Melts.
Tartrate of Potass	Bitter	Four-sided prisms	None	25	50	Melts.
Tartrate of Potass and Soda	Bitter	Eight-sided prisms	Effloresces	20	30	Melts.

[1] We have formed this Table from the more general Table of Dr. Thomson, correcting some of the proportions by experiment. See *System of Chemistry*, 4th ed. iii. 368.

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