tages over other chalybeates are its ready solubility in water, its palatable taste, and the facility with which it may be mixed with various saline substances, without undergoing decomposition. It contains more oxide of iron than the same quantity of sulphate. The dose for an adult is five or six grains in powder, pill, or solution. It may be exhibited in porter without being detected by the taste. It may be added to the compound decoction of aloes without suffering decomposition.

Fer'ri Ace'tas.—Ac'etate of I'ron.

History.—A solution of iron in acetic acid has long been known and used in the arts. It constitutes the *iron liquor* of the dyer.

Preparation. — In the Dublin Pharmacopœia acetate of iron is directed to be prepared by digesting, for three days, one part of carbonate of iron (sesquioxide) in six parts of acetic acid, and then filtering.

Properties.—It is a deep-red liquid, having an acid chalybeate taste. It reddens litmus.

Characteristics.—When heated, it yield acetic acid. Ferrocyanide of potassium strikes a blue colour with it; infusion of galls a purplish black.

Composition.—It consists of the acetate of the protoxide and acetate of the sesquioxide of iron.

The Physiological Effects and Uses are the same as other ferruginous compounds. The Dose is from ten to twenty-five drops, in water.

Ferri Acetatis Tinctura, Ph. Dubl. (Acetate of potash, two parts; sulphate of iron, one part; rectified spirit, 26 parts. Rub together the acetate and sulphate, then dry, and add the spirit. Digest for seven days, then filter.)—In this process sulphate of potash and acetate of iron are formed: the latter, as well as the excess of the acetate of potash, dissolves in the spirit. It is a claret-coloured tincture. It possesses the usual properties of a ferruginous compound. It is said to be an agreeable chalybeate, and was introduced into the Dublin Pharmacopœia by Dr. Perceval. The dose is from half a drachm to a drachm.

Tinctura Acetatis Ferri cum Alcohol, Ph. Dubl. (Sulphate of iron; acetate of potash, $\overline{aa}$ ℥j.; alcohol, ℥xxxij. Triturate together the sulphate and acetate, then dry, and when cold add the alcohol. Digest for twenty-four hours.)—The dose is twenty drops to a drachm.

Order 27.—Binoxide of Manganese.

Mangane'sii Binox'ydum.—Binox'ide of Man'ganese.

History.—Native binoxide of manganese has been long known and used in the manufacture of glass (*magnesia vitriariorum*); but until Kaim, in 1770, succeeded in extracting a peculiar metal from it, it was usually regarded as an ore of iron. It is commonly termed *native black* or *peroxide of manganese*, or for brevity *manganese*.

Natural History.—The oxide of manganese used in chemistry and pharmacy is the native anhydrous binoxide, called by mineralogists *pyrolusite*. It is found in great abundance in Cornwall, Devonshire, Somersetshire, and Aberdeenshire, from whence most of what is met with

in commerce in this country is obtained. The principal mines of it are in the neighbourhood of Launceston, Lifton, and Exeter. The Upton Pyne mine, once celebrated for its oxide of manganese, has yielded scarcely any for several years past, if, indeed, it be not completely worked out. Pyrolusite is also found in Saxony, Hungary, France, and other countries of Europe.

Preparation.—Native binoxide of manganese after being raised from the mine is broken into small pieces, about the size of peas, and then washed to separate the earthy impurities. It is afterwards ground in mills to an impalpable powder.

Properties.—This mineral occurs massive, columnar, crystallized, and pulverent: the primary form of the crystals is the right rhombic prism. The massive variety has sometimes a metallic lustre, but is generally dull and earthy: its colour is iron black or brownish: it soils the fingers in handling it: its sp. gr. varies from 4·6 to 4·9: it is tasteless, odourless, and insoluble in water: it yields a black powder.

Characteristics.—When heated it yields oxygen gas. Mixed with common salt and sulphuric acid it gives out chlorine. Heated with sulphuric acid it evolves oxygen, and forms a sulphate of the protoxide of manganese. It is infusible before the blow-pipe; dissolves in fused borax with effervescence, and colours the globule of an amethystine colour. If it be digested in hydrochloric acid until chlorine cease to be evolved, and the solution slightly supersaturated with ammonia, we get rid of the sesquioxide of iron: the filtered liquid throws down a white precipitate with ferrocyanide of potassium.

Composition.—Pure binoxide of manganese has the following composition:—

	Eq.	Eq. Wt.	Per Cent.	Forchhammer	Berzelius & Arfvedson.
Manganese	1	28	63·5	63·75	64·02
Oxygen	2	16	36·5	36·25	35·98
Binoxide of Manganese	1	44	100·0	100·00	100·00

The native binoxide is, however, never pure: it usually contains oxide of iron, carbonate of lime, sulphate of baryta, and argillaceous matter. Its purity is judged of by the quantity of oxygen or of chlorine which it is capable of yielding. The brown varieties are inferior to the black ones.

Physiological Effects.—The effects of this substance are imperfectly known. Kapp (*Hufeland's Journ.* Bd. xix. St. 1, S. 176) first employed it internally. He regards it as a permanent stimulant, and says it promotes the appetite and digestion. Vogt (*Pharmakodynamik*) places it among the tonics, and considers it to be intermediate between iron and lead, but his views are altogether theoretical, as he does not seem to have employed it. Dr. Coupar (*Brit. Ann. of Med.* Jan. 13, 1837, p. 41) has described several cases of disease which took place among the men engaged in grinding it at the chemical works of Messrs. Tennant and Co. in Glasgow: from these it appears, when slowly introduced into the system, to produce paralysis of the motor nerves. The disease commences with symptoms of paraplegia. It differs from lead in not causing colica pictonum or constipation, and from mercury in first affecting the lower extremities, and in not exciting tremors of the affected part. C. G. Gmelin (*Versuche ü. d. Wirkungen*, &c.) tried the effect of the sulphate of the protoxide of manganese on animals, and found that it

caused vomiting, paralysis, without convulsions, and inflammation of the stomach, small intestines, liver, spleen, and heart. Gmelin observes, as remarkable, "the extraordinary secretion of bile produced by it, and which was so considerable that nearly all the intestines were coloured yellow by it, and the large intestines had a wax yellow colour communicated to them," (*op. cit.* 90.) It deserves notice, in connexion with this effect, that the *sel désopilant* of Rouvière, used as a quack remedy to evacuate bile, contains chloride of manganese (*Journ. de Chim. Méd.* v. 534.)

Dr. Thomson has seen an ounce of the sulphate swallowed without any effect, except the free action of the bowels, (Coupar, *op. cit.*) Hünefeld (*Horn's Archiv f. Med.* Erf. 1830, quoted by Wibmer, *Wirk. d. Arzn.*) gave to a rabbit nearly two drachms of manganesic acid, in three days, in doses of ten or fifteen grains. The only obvious effect was increased secretion of urine. The animal being killed, the peritoneum and external coat of the colon was found of a greenish colour [protoxide of manganese is green], the muscles were readily lacerated and pale, the liver was inflamed, the bile increased. Wibmer (*op. cit.*) gave six grains daily of the carbonate of the protoxide of manganese to a rabbit during many weeks. No disturbance of function was observed. The animal was killed, but neither in the blood nor the muscles could the least trace of manganese be detected.

Uses.—It is rarely employed in medicine. Kapp (*op. cit.*) administered it, as well as the salts of manganese, internally as well as externally in the various forms of syphilis. In herpes, scabies, and the scorbutic diathesis, he used it with benefit. Brera (Harless, *Neues Journ. d. Ausl. Med. Lit.* Bd. viii. St. 2, S. 57) used it in chlorosis, scorbutus, hypochondriasis, hysteria, &c. Otto (*Frorieps Notizen*, Bd. xii. No. 22, S. 347) administered it in cachectic complaints with favourable results. Odier (*Handb. d. pr. Arzneiwiss.* quoted by Richter) employed it in cardialgia. It has been applied as an absorbent in the treatment of old ulcers, as a depilatory, and as a remedy for skin diseases, especially itch and porrigo (Rayer, *Treat. on Skin Diseases*, by Willis, p. 58.)

Administration.—Internally it has been given in the form of pills, in doses varying from three grains to a scruple, three or four times in the day. As a local agent it has been used in the form of gargle, composed of two or three drachms of the oxide diffused through five or six ounces of barley water. An ointment, consisting of one or two drachms of oxide to an ounce of lard, has also been used.

In chemistry and pharmacy it is employed in the manufacture of oxygen, chlorine, and iodine. In the arts it is used by the bleacher for the production of chlorine; by the glass-maker to destroy the brown colour communicated to glass by iron; and to give an amethystine tint to plate glass; and by the potter for colouring earthenware.

END OF PART I.

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