

cachexia produced by *chronic bronchitis* with profuse expectoration, *leucorrhœa*, and similar exhausting discharges, may be much improved by the phosphates, and with the general improvement of the bodily state there usually takes place an arrest of the local morbid process.

The explanation of the therapeutical action of the phosphates in the diseases just mentioned is equally true of their use in *phthisis*. The utility of the *hypophosphites* in this disease is not any greater, for it is probably true that these preparations undergo oxidation in the stomach and pass to phosphates. The compound sirup of the hypophosphites is an agreeable preparation and is readily taken, and certainly proves serviceable in the more chronic forms of the disease. The lacto-phosphate, the phosphates, and the hypophosphites, are undoubtedly useful in *chronic phthisis*, *fibroid lung*, *chronic tuberculosis*, *emphysema*, and *dilated bronchi*, but no advantage can be expected from them in acute tuberculosis and caseous pneumonia. The utility of these preparations in these groups of maladies depends on their power to promote constructive metamorphosis. If they improve the appetite, promote digestion, and increase the body-weight, they do good; if they disagree with the stomach, they do harm (Bennett). Not unfrequently the sirup of the hypophosphites gives rise to distressing tormina. This may be obviated by combining with it dilute phosphoric acid—a combination very effective, therapeutically: ℞ Syrp. hypophos. comp., ℥ iijss; acid. phosphor. dil., ℥ ss. M. S.: A teaspoonful three times a day. Such a combination may be advantageously given with cod-liver oil, after meals, in chronic phthisis. The addition of arsenic contributes very materially to the therapeutical effects of the lacto-phosphate; for example: ℞ Syrp. calcii lacto-phos., ℥ iv; liq. potassii arsen., ʒ j. M. S.: A dessert-spoonful *ter die*.

Late favorable reports regarding the curative effects of phosphorus and its compounds in *pernicious anæmia* have not been confirmed by the most recent experience.

Percy, who has distinguished himself by researches on phosphorus, prepares hypophosphorous acid by passing through a solution of phosphorus in oil, perfectly pure and dry oxygen. He maintains that hypophosphorous acid is the only preparation of phosphorus which should be employed in medicine.

Further experience with the phosphate of soda justifies the author in the expression of his belief that it has the power to retard the growth of the changes known as *sclerosis of the liver*, and possibly, under favorable circumstances, to arrest them and to restore a comparatively normal functional state. When, in obese subjects, a *succession of boils* portends the development of diabetes, this remedy is highly useful. It has seemed very beneficial in the hepatic form of *diabetes*. No remedy is more effective in removing that condition of the system which produces *furuncles*, or *boils*.

## IRON AND ITS PREPARATIONS.

*Ferrum*.—*Fer*, Fr.; *Eisen*, Ger. “In the form of fine, bright, non-elastic wire.”

*Ferrum Reductum*.—Reduced iron. *Ferri pulvis*. A tasteless powder of an iron-gray color. Dose, gr. ss—gr. ij.

*Ferri Carbonas Saccharatus*.—Saccharated carbonate of iron. A greenish-gray powder, odorless, having at first a sweetish, afterward a slightly ferruginous taste. It is only partially soluble in water. Dose, gr. ij.

*Trochisci Ferri*.—Troches of hydrated oxide of iron. Composition: Hydrated oxide of iron, vanilla, sugar, and mucilage of tragacanth. Dose, one to five.

*Ferri Oxidum Hydratum*.—Hydrated oxide of iron. Kept in the form of a soft magma and used as an antidote to arsenic.

*Ferri Oxidum Hydratum cum Magnesia*.—Hydrated oxide of iron with magnesia. (For arsenical poisoning.)

*Pilule Ferri Compositæ*.—Compound pills of iron. Composition: Myrrh, carbonate of sodium, sulphate of iron. Dose, one or two pills.

*Massa Ferri Carbonatis*.—Mass of carbonate of iron (Vallet's mass). Sulphate of iron, carbonate of sodium, honey, sugar, etc. Dose, gr. iij—gr. v.

*Mistura Ferri Composita*.—Compound mixture of iron. Composition: Myrrh, sugar, carbonate of potassium, sulphate of iron, spirit of lavender, rose-water. Dose, a tablespoonful.

*Emplastrum Ferri*.—Iron-plaster, strengthening-plaster. Composition: Subcarbonate of iron, lead-plaster, and Burgundy pitch.

*Ferri Hypophosphis*.—Hypophosphite of iron. A white or grayish-white powder, odorless and nearly tasteless, only slightly soluble in water.

*Ferri Phosphas*.—Phosphate of iron. A bright, slate-colored powder, insoluble in water. Dose, gr. ij—gr. v.

*Ferri Pyrophosphas*.—Pyrophosphate of iron. In apple-green scales, having an acidulous, slightly saline taste, and wholly soluble in water. Dose, gr. ij—gr. v.

*Ferri Sulphas*.—Sulphate of iron. In transparent, bluish-green crystals, which, on exposure to the air, effloresce and change color. Is wholly soluble in water. Dose, gr. j—ij.

*Ferri Sulphas Exsiccata*.—Dried sulphate of iron. A grayish-white powder, soluble in water with the exception of a small residue. Dose, gr. j—gr. ij.

*Ferri Sulphas Præcipitatus*.—Precipitated sulphate of iron. A pale, bluish-green powder; oxidizes in contact with moisture; soluble in 1.8 part of water at 60° Fahr. Dose, gr. ij—gr. v.

*Liquor Ferri Subsulphatis*.—Solution of subsulphate of iron. Mon-

sel's solution. Composition : Sulphate of iron, sulphuric acid, nitric acid. An inodorous, sirupy liquid, of a ruby-red color, and of an extremely astringent taste, without causticity. It mixes with water and alcohol, in all proportions, without decomposition.

*Liquor Ferri Tersulphatis.*—Solution of tersulphate of iron. Composition : same as preceding preparation, except the quantity of acid. A dark, reddish-brown liquid, nearly devoid of odor, and of an acid and extremely styptic taste.

*Ferri Chloridum.*—Chloride of iron. In orange-yellow, crystalline pieces, very deliquescent, and wholly soluble in water, alcohol, and ether. Dose, gr. j—gr. ij.

*Liquor Ferri Chloridi.*—Solution of chloride of iron.

*Tinctura Ferri Chloridi.*—Tincture of chloride of iron. Composition : Solution of chloride of iron, alcohol. Dose, ℥ v—℥ xx.

*Liquor Ferri Nitratis.*—Solution of nitrate of iron. A transparent liquid, having a pale amber color. Dose, ℥ ij—℥ v.

*Syrupus Ferri Iodidi.*—Sirup of iodide of iron. A transparent liquid of a pale-green color. Composition : Iodine, iron, sirup. Dose, ℥ x—℥ lx.

*Pilule Ferri Iodidi.*—Pills of iodide of iron. Composition : Iodine, iron, sugar, liquorice, and gum-arabic. Dose, one to three pills.

*Liquor Ferri Citratis.*—Solution of citrate of iron.

*Ferri Citras.*—Citrate of iron. Dose, gr. ij—gr. v. "Transparent, garnet-red scales, odorless, and having a very faint ferruginous taste and an acid reaction ; slowly but completely soluble in cold water ; insoluble in alcohol."

*Ferri et Ammonii Citras.*—Citrate of iron and ammonium. In garnet-red, translucent scales, having a slightly ferruginous taste, and readily and wholly soluble in water. Dose, gr. ij—gr. v.

*Ferri et Ammonii Sulphas.*—Sulphate of iron and ammonium. Ammonio-ferric alum. In octahedral crystals of a pale violet color, soluble in one and a half part of water at 60°. Dose, gr. j—gr. ij.

*Ferri et Ammonii Tartras.*—Tartrate of iron and ammonium. In transparent garnet-red scales, which have a saccharine taste. It is slowly soluble in rather more than its weight of water, but insoluble in alcohol and ether. Dose, gr. ij—gr. v.

*Ferri et Potassii Tartras.*—Tartrate of iron and potassium. In transparent scales, of a dark ruby-red color, and wholly soluble in water. Dose, gr. ij—gr. v.

*Ferri et Quininæ Citras.*—Citrate of iron and quinia. In thin, transparent scales, reddish or yellowish brown. Taste ferruginous and bitter. Slowly soluble in cold, more readily in hot water, and not soluble in alcohol and ether. Dose, gr. j—gr. v.

*Liquor Ferri et Quininæ Citratis.*—Solution of the citrate of iron and quinine. Contains 6 per cent of quinine.

*Ferri et Strychninæ Citras.*—Citrate of iron and strychnine. Contains one grain of strychnine to 100 grains of the compound. Dose, gr. j—gr. iij.

*Liquor Ferri Acetatis.*—Solution of acetate of iron.

*Tinctura Ferri Acetatis.*—Tincture of acetate of iron. A clear, dark, reddish-brown liquid, having the odor of acetic ether, an acidulous and astringent taste, and mixes with water in all proportions. Dose, ℥ x to 3 ij.

*Ferri Lactas.*—Lactate of iron. In greenish-white crystalline crusts or grains, of a mild, sweetish, ferruginous taste, soluble in forty-eight parts of cold water, but insoluble in alcohol. Dose, gr. ij—gr. x.

*Ferri Oxalas.*—Oxalate of iron ; a lemon-yellow, crystalline powder, insoluble in water. Dose, gr. ij—gr. v.

*Vinum Ferri Amarum.*—Bitter wine of iron (solution of citrate of iron and quinine, tincture of sweet orange-peel, sirup, and stronger white wine). Dose, a teaspoonful to a tablespoonful.

*Vinum Ferri Citratis.*—Wine of citrate of iron. Dose, a teaspoonful to a tablespoonful.

Besides the official preparations of iron, there are numerous unofficial formulæ to which some attention must be paid. The following are the most meritorious of these :

*Ferri Arsenias.*—Arseniate of iron. A tasteless powder of a green color, insoluble in water, but soluble in hydrochloric acid. Dose, gr.  $\frac{1}{10}$ —gr.  $\frac{1}{6}$ .

*Syrupus Ferri et Manganis Iodidi.*—Sirup of the iodides of iron and manganese. Dose, 3 j.

*Mistura Ferri Aromatica.*—Composition : Pale bark in powder, 4 ; calumba, in powder, 2 ; cloves, bruised, 1 ; iron wire, 2 ; compound tincture of cardamoms, 12 ; tincture of orange-peel, 2 ; peppermint-water, 50 ; macerate the first four ingredients in the last one for three days, agitating occasionally, filter, add the tinctures, and make up to 50. Dose, ʒ j—ij (Squire).

*Syrupus Ferri et Manganis Phosphatis.*—Sirup of the phosphate of iron and manganese. Dose, 3 j.

*Mistura Ferri Laxans.*—Composition : Sulphate of iron, 2 grains ; sulphate of magnesia, 1 drachm ; dilute sulphuric acid, 3 minims ; spirit of chloroform, 20 minims ; peppermint-water to 1 oz. (Squire).

*Ferrum Dialysatum.*—Dialyzed iron. This preparation is made by the process of diffusion, and is iron in the colloid state. It is odorless, without the styptic taste of the ferruginous preparations, does not blacken the tongue and teeth, is free from irritant action, and does not constipate. It is precipitated by sulphuric acid, by acids, and by various salts, but neither by alcohol nor sugar. It is doubtful whether it be a good form in which to administer iron. Dose, ℥ v—3 i. If

any given preparation has a styptic taste, and acts on the tongue and teeth, it is not genuine.

Reduced iron is one of the most useful ferruginous preparations for internal administration, comparatively tasteless, and therefore easy of administration, and readily soluble in the juices of the stomach. The objection to its use is the occurrence of eructations, sulphureted or phosphureted, owing to the oxidation of the iron, the evolution of hydrogen, and the combination of the nascent hydrogen with sulphur or phosphorus.

The so-called subcarbonate of iron is really little more than the red oxide. In the official *pilulæ ferri carbonatis*, the oxidation of the iron and the loss of carbonic acid are prevented by the sugar. This preparation is very soluble in the stomach-juice, and is readily assimilated. The troches of carbonate of iron are convenient for administration to children, who take them readily. The hydrated oxide of iron is solely used as the antidote to arsenic in solution. For remarks on its administration I have to refer the reader to the article on Arsenic. Corresponding to these carbonates are the *pilulæ ferri compositæ*, which contain iron in the form of the carbonate, sulphate of soda, and myrrh. The *mistura ferri composita* is also a solution of the carbonate, contains myrrh and sulphate of potash, with a sufficient quantity of the latter to form an emulsion which suspends the iron.

Of the phosphates the better preparation is the pyrophosphate, which is readily soluble, unirritating, and easily assimilable. The sulphate is an active astringent, and is an efficient remedy. When prescribed in pillular form the dried sulphate should be used, as the sulphate in efflorescing destroys the cohesion of the mass. Of the several solutions intended for topical use, the liquor ferri subsulphatis, or Monsel's solution, is the best, as it is powerfully styptic without being corrosive. The tincture of the chloride of iron is most agreeably taken in the form of Creuse's tasteless preparation, which appears to be an efficient chalybeate without possessing the causticity of the pharmaceutical preparation. In the sirup of the iodide of iron and the sirup of the iodides of iron and manganese, sugar is used to prevent oxidation of the iron and the setting free of the iodine. In the iodide-of-iron pill the same result is obtained by sugar or gelatin coating.

Less irritating to the stomach, but probably less efficient as chalybeates, are the combinations of iron with vegetable acids. These may be administered dissolved in Rhine, Catawba, or sherry wine. An elegant mode of prescribing them is in effervescence—the citrates or tartrates dissolved in a solution of citric or tartaric acid, and poured into a solution of sodium or potassium bicarbonate—to be drunk in effervescence.

**ANTAGONISTS AND INCOMPATIBLES.**—The carbonates are incompatible with acids and acidulous salts and vegetable astringents; the

citrates and tartrates with mineral acids, alkalies and their carbonates, tannic acid; the iodides with acids, acidulous salts, alkalies and their carbonates, lime-water, vegetable astringents; the tincture of the chloride, with alkalies and their carbonates, lime-water, carbonate of lime, magnesia and its carbonate, and astringent vegetables turn it black.

**SYNERGISTS.**—All agents promoting constructive metamorphosis are synergistic to iron, especially animal aliment, the simple, aromatic, and astringent bitters, cinchona, manganese, bismuth, etc.

**PHYSIOLOGICAL ACTIONS.**—Although metallic iron is inert, yet in the stomach it enters into combination dissolved in the acids, and then acquires molecular activity. As a result of its oxidation in the stomach, hydrogen is liberated, which in its nascent state combines with sulphur, forming sulphureted hydrogen. In part, iron is absorbed by the stomach, probably as an albuminate; in part, in the intestinal canal. The stools under a course of iron become brownish and even black, a result which indicates that a part of the metal taken fails to be absorbed; but, since it has been shown that, whether taken by the stomach or injected into the blood, elimination takes place by the intestinal canal, it remains uncertain how much is excreted or is merely discharged unaltered in the *fæces*.

Iron is not a substance foreign to the organism. Chemical analysis has demonstrated its constant presence in the blood, in the gastric juice, chyle, lymph, bile, in the pigment of the eye, and in traces in the milk and urine. According to Gorup-Basanez (analysis of C. Schmidt), the blood of man contains one part of iron to 230 of red globules, and that of beef one part of iron to 194 of red globules. Iron exists in combination in hæmatin; according to some in the state of oxide, according to others as metallic iron. That it performs a very important office is shown in the rapid construction of red blood-globules when iron is administered in anæmia. Without it hæmatin is not formed, and the red globules diminish in number. By its medicinal use we furnish to the blood a material which it needs. In health a mixed diet contains sufficient iron for all the purposes of the economy. The blood being improved in quality by the administration of iron, the tissues are better nourished, and all the functions are performed with more vigor.

The physiological action of iron is not limited merely to the construction of red blood. When there is no intolerance to its presence in the stomach, it promotes the appetite and invigorates the digestion. By increasing the disposition for food and the ability to dispose of it, iron acts as a stomachic tonic. Hence, when given in the healthy state, or when administered for too long a period in disease, the gastric glands become exhausted by over-stimulation, and then it is said the iron disagrees. Being a restorative, its use is contraindicated in a condition of plethora, especially when there exists a tendency to hæm-

orrhage, or when there is reason to suspect an atheromatous state of the cerebral vessels.

In large doses the soluble preparations of iron give rise to nausea and vomiting. Some of them possess more or less toxic activity; the per-salts are more active than the proto-salts. The iodide and chloride, the nitrate and sulphate, are the most active, death having ensued from the tincture of the chloride in one case (Christison), and alarming symptoms having occurred in others (Taylor).

Certain of the salts of iron, the sulphates, the nitrates, the chlorides, possess a high degree of astringency. Hence they produce constipation when taken internally. Brought into contact with blood, they coagulate it, forming a tough, brownish magma; and, as the albuminous elements of the tissues are also solidified, they are powerful hæmostatics.

Iron is eliminated by several channels. Its passage down the intestinal canal and exit by this route have already been alluded to. As the experiments of Lussana have shown, a large part of the iron which enters the portal circulation is eliminated by the liver in the bile. On the other hand, the chief part of the iron which is made to enter the systemic circulation is eliminated by the kidneys. Much of that which is absorbed from the intestinal canal enters the capillary system of the liver, diffuses through into the bile, and but a small part finally enters the systemic circulation.

The acid and astringent preparations of iron act on the teeth with considerable energy, as the experiments of Dr. Smith (of Edinburgh) prove.

The tincture of the chloride and the sulphate are more corrosive than the wine, and of course are more injurious than the compounds of iron with the vegetable acids.

THERAPY.—Iron-spray—a weak solution of the liquor ferri subsulphatis (3j— $\bar{z}$  viij)—is very serviceable as an astringent in obstinate cases of *epistaxis*. The nozzle of the delivery-tube of the spray-douche should be inserted just within the anterior nares, and the spray be driven with considerable force. The same application is beneficial in *chronic coryza*, but the objection to its use is the danger of coloring the teeth. In *pulmonary hæmorrhage*, the same application made to enter the throat with the inspired air will often arrest the flow of blood; and this, notwithstanding so little iron can pass the chink of the glottis.

The subsulphate and pernitrate solutions are the most efficient remedies for arresting *hæmatemesis*. They should be given in small doses—one or two drops, well diluted with ice-water, and frequently. In the absence of these, the tincture of the chloride may be used in the same way. In *intestinal hæmorrhage* the astringent preparations of iron are much less beneficial, if, indeed, they serve any useful purpose—for they are converted into inert sulphides as they descend the canal.

The author has seen the intestinal hæmorrhage of typhoid fever much increased by the rectal injection of a solution of Monsel's salt. The *bleeding from hæmorrhoids* may be much diminished and even arrested by washing the tumors, when they protrude, with the solution of the subsulphate. After the application of the iron, the tumors should be well oiled before returning them into the rectum. The solution of the pernitrate of iron has been very efficacious as an astringent in *chronic diarrhœa and dysentery*, in that known as the army diarrhœa. These diseases, as they occur in civil practice, may sometimes be arrested by this agent, but not usually, in the author's experience. A solution of the tincture of iron is one of the numerous remedies used to destroy the *ascarides vermiculares*—the thread-worms which infest the rectum. As the development of these parasites is favored by the anæmic state, it is good practice to conjoin with any local treatment the internal use of iron, notably the sirup of the iodide.

Iron is frequently given with advantage to promote *appetite and digestion* merely. Indeed, it is the opinion of some eminent authorities that the chief use of iron as a remedy, even in anæmia, is to promote the digestive function. For the purpose of increasing appetite and energizing digestion, the sulphate is the best chalybeate, unless, indeed, the mucous membrane prove intolerant. When digestion is feeble, and the intestinal movements sluggish, it is often advantageous to combine aloes with iron, as in the official aloes-and-iron pill, or with sulphate of magnesia, as in the *mistura ferri laxans*, the formula for which has been given.

The condition most usually requiring iron is *anæmia*, a deficiency not only of the hæmatin but of the red corpuscles. Iron is given in this state with the view of supplying to the organism a material in which it is deficient, and in this way promoting the construction of the red globules. As, however, food, especially beef, is rich in iron, and as but a small amount of that administered is really assimilated, there is much reason for holding that at least an important function of iron in anæmia consists in its power to promote appetite and digestion. Practical physicians are familiar with the fact that iron improves but little, if at all, the condition of the anæmic, when it does not increase the desire for food and the ability to digest it. In anæmia, iron is given with two objects: to furnish a needed material to the blood; to increase the energy of the primary assimilation. To accomplish the first object, small doses—one or two grains—of reduced iron or of the carbonates, or some one of the combinations with vegetable acids, are most suitable. The second object is best attained by the more active astringent preparations, especially the sulphate and the chloride. Large doses of these are frequently well borne. When they disagree, other salts may be tried, but preference should be given to the most astringent preparation which the patient's stomach will tolerate.

In *chlorosis*, the good effects of iron are not so conspicuous as in *anæmia*, although they are allied states. During a course of iron in *chlorosis*, purgatives are now and then necessary. Better results are obtained from a combination of iron and arsenic, and iron and strychnine, than from iron alone. The arseniate of iron is an excellent remedy in *chlorosis*, but it must be given in larger doses than the posological tables authorize, for it is by no means so actively toxic as is commonly supposed. A good formula is the following: ℞ Ferri arseniat., gr. ij; ext. cinchonæ, gr. xij. M. Ft. pil. no. xij. Sig.: One three times a day after meals.

In *anæmia* and *chlorosis*, the iron should be taken after meals to be mixed with the food. The preparations of iron should not be continued too long; occasional intermissions in their use are necessary, otherwise the digestive organs become deranged, and the good effects are lost. Occasional purgation is useful, and acts in a way to favor the absorption and assimilation of the iron. Air and exercise should always, if practicable, be prescribed in a ferruginous course, for the assimilation of iron is directly favored by these hygienic influences.

The *anæmia of chronic malarial poisoning* is especially improved by iron. If enlargement of the spleen and engorgement of the portal circulation co-exist, the use of the compound jalap-powder should precede the iron; or the latter may be combined advantageously with resin of podophyllin, as follows: ℞ Quininae, ʒj; resinæ podophylli, gr. iv; ferri sulphatis exsic., ʒj. M. Ft. pil. no. xx. Sig.: One three times a day.

According to some, *massa ferri carbonatis* is preferable to the sulphate; it is certainly sometimes better borne. ℞ Mas. ferri carbonatis, ʒj; acidi arseniosi, gr. j; quininae sulph., ʒij. M. Ft. pil. no. xl. Sig.: Two pills three times a day. In *enlarged spleen* of malarial origin, a combination of sulphate of iron with sulphate of quinine is generally preferred. ℞ Quininae sulphat., ʒj; ferri sulphat. exsic., ʒjss. M. Ft. pil. no. xxx. Sig.: One pill three times a day, or four or five during the day.

Although the preparations of iron are of little service in *leucocythæmia*, they are certainly in a high degree useful in *pseudo-leucocythæmia*, or *cachexia of the spleen*. In the latter disease the relative number of blood-corpuscles may be greatly reduced, but they can be increased in number and raised to the normal by the use of those materials needed by the blood-making organs, especially by the use of iron.

In *syphilitic cachexia*, the preparations of the iodide of iron possess a high degree of utility. In *sloughing phagedæna*, or simple *chaneroid*, the iodide is frequently prescribed when these accidents occur in debilitated constitutions. Some authorities prefer the tartrate of iron under these circumstances, but the iodide acts with more promptness and

vigor. In the treatment of *constitutional syphilis*, the ferruginous preparations are only useful in so far as they may be applied to promote constructive metamorphosis. More commonly than is supposed by the advocates of special plans of treatment, tonic remedies, especially chalybeates, exercise a most favorable influence over the course and duration of syphilis. ℞ Iodoformi, ʒj; hydrargyri chloridi corrosiv., gr. j; ferri redacti, ʒj. M. Ft. pil. no. xx. Sig.: One pill three times a day. ℞ Iodoformi, chinoidin., ferri redacti, āā ʒj. M. Ft. pil. no. xx. Sig.: One pill three times a day.

Iron is one of the remedies most useful in the treatment of *acute rheumatism*. As was originally suggested by Reynolds, the tincture of the chloride is most serviceable. It is more especially adapted to the treatment of pale, delicate, and cachectic subjects, and is much less beneficial, if not positively harmful, in the plethoric and overfed. Given in suitable cases, the tincture of iron, in doses of ℥ xx—xxx every four hours, diminishes the pain, fever, and sweats; lessens the chances of cardiac mischief, and hastens convalescence. By retarding waste and favoring excretion of uric acid through the kidneys, the duration of the disease is shortened and a tedious convalescence is prevented. We owe to Dr. Anstie the important suggestion that tincture of chloride of iron may be used successfully as a *prophylactic against acute rheumatism*. Here, again, the author must state, as a result of his personal observation, that such prophylactic treatment is very useful in weak and cachectic subjects and not applicable to the robust and full-blooded. The tincture of iron should be administered without delay in such weak subjects with a rheumatic history, when they complain of lassitude, muscular pains, sore joints, furred tongue, although they are yet free from fever and joint-swelling.

The treatment of *erysipelas* by large doses (℥ x—ʒj every four hours) of tincture of chloride of iron is now very generally adopted. It is questionable whether this practice is directly beneficial. Its utility depends chiefly on the support which it affords to the organism while laboring under a debilitating disease, and, as an abundant supply of aliment is prescribed with the iron, it is impossible to estimate in any given case how far the result may be attributable to the remedy.

Influenced by the same considerations, the tincture of iron is frequently prescribed in *diphtheria*, alone or in combination with chlorate of potassa. Although it possesses no special utility in this disease, it may serve as one of the means for maintaining the forces of the body, and in this way indirectly contribute to a favorable result. There is no advantage in applying the tincture of iron to the fauces in diphtheria; it is not a solvent of the false membrane, and can not prevent the spread of the exudation; it is, however, now freely used, and it is said with good results.

In the treatment of *scrofula*, *strumous enlargement of the cervical*,

*inguinal, and mesenteric glands*, and in *ricketts*, the preparations of iron occupy a most important place. In these affections the sirup of the iodide of iron is generally preferred, and excellent results are obtained from a combination of phosphate of iron and phosphate of lime, especially in ricketts. In these cases, also, the sirup of the iodides of iron and manganese is indicated. Iron is one of the remedies most frequently prescribed in *chronic tuberculosis*, but it has no special influence over the deposition of tubercle. It helps to a better state of the blood-making process, and, by promoting the constructive metamorphosis, hinders the progress of the malady.

As *neuralgia* so often depends on anæmia, it happens that iron is one of the most frequently prescribed remedies for this disease. Anstie prefers large doses (π xxx—xl *ter die*) of the tincture of the chloride, and twenty-grain doses of the saccharated carbonate twice or three times a day.

In *disorders of the mind*, either dependent on or increased by an anæmic state, iron is often useful. In *chronic mania* and *melancholia*, when debility is present, iron is employed as a restorative agent. The ferruginous preparations are especially useful in the *anæmic forms of puerperal mania*, and in the *insanity of lactation*. Bucknill and Tuke prefer the tincture of the chloride in these affections.

Whenever *epilepsy* occurs in weak and anæmic subjects, iron is indicated. Cases of this disease, essential in character and dependent on cerebral anæmia, are sometimes cured by iron alone. The author has seen excellent results from a combination of bromide of iron and bromide of potassium in such cases: ℞ Potassii bromidi, ℥ j; ferri bromidi, gr. iv; aquæ, ℥ ij; syrup. simplicis, ℥ vj. M. Sig.: A tablespoonful *bis die*.

Large doses of subcarbonate of iron have long been used with advantage in *chorea*. When the subject of this disease is distinctly anæmic, iron, in some of its forms, is unquestionably serviceable, and its utility is often increased by combination with purgatives. When anæmia is not present, arsenic is preferable to iron. Chorea arising from moral causes (anger, fright, etc.), and from pregnancy, is not benefited by iron. This remedy is especially adapted to the chorea of anæmic girls about the age of puberty.

The preparations of iron are of course inadmissible in acute affections of the respiratory organs, but, in certain of the chronic forms and stages of these diseases, some of the chalybeates are very useful. In *chronic bronchitis*, with free expectoration, the *mistura ferri composita* has long been used with advantage. At the present time the phosphate of iron, quinine, and strychnine, is generally preferred in *chronic bronchitis*, in the *chronic forms of phthisis*, in *emphysema*, and in *humid asthma*. Iron is contraindicated when pulmonary hæmorrhage exists or is threatened. A combination of tincture of digitalis

and tincture of chloride of iron abates the temperature and diminishes the sweats of hectic fever. ℞ Tinct. digitalis, ℥ iij; tinct. ferri chloridi, ℥ v. M. Sig.: Fifteen drops three or four times a day.

In *fatty degeneration of the heart*, the preparations of iron render important service, by improving the nutrition of the organ. The *palpitations*, the *murmur*, and *præcordial anxiety* which accompany cases of anæmia and chlorosis, are relieved by chalybeate medicines. In *dilatation of the cavities of the heart*, especially the right, accompanied by cough, difficult breathing, and general dropsy, greater relief is sometimes experienced from the preparations of iron than by the so-called cardiac sedatives and diuretics. In these cases, as also in *mitral regurgitation*, the distress of the patient increases with increasing thinness of the blood, and is diminished by those remedies, such as iron, which improve the quality of the blood. A combination of iron, digitalis, and squill, is sometimes extremely serviceable in these cases—for example: ℞ Ferri redacti, quininae sulphat., pulv. digitalis (English), āā ℥ j; pulv. seillæ, gr. x. M. Ft. pil. no. xx. Sig.: One pill three or four times a day. Iron may be used with advantage to assist in the process of *compensation in valvular lesions*, when the condition is one of anæmia. Iron is contraindicated in all cases of cardiac disease occurring in those who are full-blooded.

In the passive forms of hæmorrhage—in *purpura*, the *hæmorrhagic diathesis*, *epistaxis*, *gastric*, *intestinal*, and *renal hæmorrhage*, when they are due to anæmia or favored by it—iron is unquestionably useful, and the preparation most generally applicable is the tincture of the chloride.

Derangements of the *menstrual function*, when associated with anæmia, more especially when produced by anæmia, are often removed by the use of chalybeate medicines. *Amenorrhœa* is, more frequently than to any other cause, due to anæmia of the ovaries, consecutive to chlorosis or general anæmia, and *dysmenorrhœa* may depend, in one of its forms at least, upon the same condition of the blood. *Menorrhagia* may also be one of the results of an impoverished state of the blood. Iron is the most appropriate medicament in these disorders. It is the judgment of Graily Hewitt and Barnes that “small doses of iron are generally the best” in amenorrhœa. Barnes prefers the solution of the acetate, and speaks favorably of the citrate of iron and ammonia, given in an effervescent state, and of the combination of iron and strychnine. The use of ferruginous preparations in menstrual disorders should be determined by the results of a careful differentiation of the causes. The absence of the uterus and ovaries, occlusion of the cervix, and various other conditions besides anæmia, should be eliminated, and the use of iron restricted to those cases in which an impoverished state of the blood is either the only factor or an influential one.

The injection of the various styptic solutions of iron into the

uterine cavity, to arrest *post-partum hæmorrhage*, is now common practice. Notwithstanding the alleged innocuousness of this treatment, it is probable, as Snow Beck has shown, that fatal results have ensued from the incautious use of these injections. The official solutions of the perchloride and subsulphate have been thrown into the uterine cavity, with the effect to cause uterine thrombosis, followed by systemic infection. These solutions are much too strong; one part of Monsel's solution to three of water is sufficiently styptic, and is probably perfectly safe. The uterine cavity should be cleared of clots, and the nozzle of the syringe carried well up to the fundus, when the injection should be slowly delivered. The reader need hardly be reminded that this expedient is only proper after the usual means for securing uterine contractions have failed. The same plan of styptic injections has been used to arrest the *hæmorrhage from abortion*, but caution is necessary in these cases, for it is essential to safety that there be an open and patulous condition of the os, to permit escape of coagula. Similarly these injections are used to restrain bleeding in cases of *uterine fibroids*, *uterine cancer*, and in the *uterine hæmorrhage* dependent on spongy granulation of the mucous membrane. In every case of such use of styptic iron injections, it is essential, first, that air be not pumped into the uterine cavity, and second, that sufficient dilatation of the cervical canal exist to permit ready exit to the surplus fluid and coagula.

In *albuminuria*, connected with chronic changes of the kidney, iron is often very serviceable to improve the digestion, and to correct the anæmia, which is such an obvious feature of these maladies. The tincture of the chloride and the tincture of the acetate—especially the latter—are preferred, partly on account of their value as hæmatinic remedies, and partly because of their supposed diuretic action. When *spermatorrhœa* is dependent upon an impoverished condition of the blood, with relaxation of the vesiculæ seminales, the tincture of iron is useful, but it is rarely of itself sufficient to effect a cure. The chalybeates are only harmful in those cases of *nocturnal seminal losses* which in the robust are merely significant of plethora. In *gleet* occurring in anæmic subjects, and in the *prostorrhœa* and *catarrh of the urethra* which arise from relaxation, the preparations of iron are useful adjuncts to other measures. ℞ Tinct. ferri chloridi, ʒvj; tinct. cantharidis, ʒij. M. Sig.: Fifteen drops in water, three times a day.

The sirup of iodide of iron is one of the most successful remedies in the *nocturnal incontinence of urine* in children. The precise indications for its use are not evident. Sometimes belladonna succeeds better. It appears to the author that the iodide of iron is more useful in the case of pale, delicate, and strumous children, and belladonna in those who are more robust, the condition in the former being one of

atony of the muscular wall of the bladder, in the other too ready contraction from the reflex stimulation of acid urine. In these cases of incontinence of urine the sirup of the iodide should be given in doses of fifteen to twenty minims, well diluted with water, three times a day.

LOCAL USES.—The styptic preparations of iron are frequently used to restrain *hæmorrhage*. *Leech-bites* that bleed too profusely, *hæmorrhage after extraction of teeth* or in minor *surgical operations*, oozing from a large wounded surface, may often be checked by the use of Monsel's solution.

As a topical application in *gonorrhœa* after the acute symptoms have subsided, in *mucous cervicitis*, in *leucorrhœa*, the styptic preparations of iron are certainly useful, but a strong objection to their use arises from the staining of the clothing.

Monsel's solution is an effective application to *fissured nipples*: ℞ Liquor ferri subsulphatis, ʒij; glycerini, ʒvj. M. Sig.: Apply with a camel's-hair brush to affected parts. Pure solution of subsulphate of iron will arrest the growth and cause the exfoliation of *syphilitic vegetations* of the glans and prepuce.

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