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MERCURY AND ITS PREPARATIONS.

Hydrargyrum.—Mercury. *Mercure*, Fr.; *Quecksilber*, Ger. A silver-white metal, liquid at common temperatures, and having the specific gravity 13·5. It is wholly volatilized by heat, and is dissolved without residue by nitric acid.

Preparations. — *Emplastrum Ammoniaci cum Hydrargyro.*—Plaster of ammoniac with mercury. Composition: Ammoniac, 720 parts; mercury, 180 parts; diluted acetic acid, 1,000 parts; olive-oil, 8 parts; sublimed sulphur, 1 part.

Emplastrum Hydrargyri.—Mercurial plaster. Composition: Mercury, 30 parts; olive-oil and resin, of each, 10 parts; lead-plaster, 50 parts.

Hydrargyrum cum Creta.—Mercury with chalk. Composition: Mercury, 38 parts; prepared chalk, 50 parts; sugar of milk, 12 parts. A gray powder partly dissipated by heat. When a small portion is treated with dilute acetic acid in excess, it is partly dissolved, nothing remaining but mercury in the form of minute globules not visible by a magnifying power of ten diameters. Dose, gr. ss—gr. x. Eight grains contain three grains of mercury.

Massa Hydrargyri. — Pills of mercury. Blue mass. Composition: Mercury, confection of rose and licorice-root powdered. Each three grains contains one grain of metallic mercury. Dose, gr. ss—gr. xv.

Unguentum Hydrargyri. — Mercurial ointment. Composition: Mercury, lard, suet, and compound tincture of benzoin.

Hydrargyri Oxidum Flavum.—Yellow oxide of mercury. An orange-yellow powder, which, on being heated, assumes a red color; then, if the heat be increased, it evolves oxygen, and finally the mercury evaporates without residue.

Unguentum Hydrargyri Oxidi Flavi.—Ointment of yellow oxide of mercury. Composition: Yellow oxide, 10 parts; ointment, 90 parts.

Oleatum Hydrargyri.—Oleate of mercury. Yellow oxide, 10 parts; oleic acid, 90 parts.

Hydrargyri Oxidum Rubrum. — Red oxide of mercury. Red precipitate. An orange-red powder, entirely soluble in muriatic acid. When heated it does not emit reddish fumes, but gives off oxygen, while the mercury either runs into globules or is wholly dissipated.

Unguentum Hydrargyri Oxidi Rubri.—Ointment of red oxide of mercury. Composition: Red oxide, 10 parts; ointment, 90 parts.

Hydrargyri Subsulphas Flavus.—Yellow sulphate of mercury. Turpeth mineral. A lemon-yellow powder, sparingly soluble in water. It is entirely dissipated by heat, sulphurous acid being evolved, and globules of mercury sublimed. Dose, grs. ij—grs. v, as an emetic.

Hydrargyri Chloridum Corrosivum.—Corrosive chloride of mercury. Corrosive sublimate. In colorless crystals or crystalline masses, which are fusible, and sublime without residue. It is entirely soluble in water (1 in 16), alcohol (1 in 7), and in 4 parts of ether. Lime-water causes a yellowish precipitate and ammonia a white one, from its solution. Dose, gr. $\frac{1}{30}$—gr. $\frac{1}{10}$.

Hydrargyri Chloridum Mite.—Mild chloride of mercury. Calomel. A white powder, wholly volatilized by heat, and insoluble in water, alcohol, and ether. With solution of potassa it yields a black precipitate of oxide of mercury, which is reduced by heat to the metallic state. Distilled water, after having been boiled with it, yields no precipitate with ammonia or nitrate of silver. Dose, gr. $\frac{1}{20}$—grs. x.

Pilulæ Antimonii Compositæ. — Compound pills of antimony. Plummers' pills. Composition : Sulphurated antimony, calomel, and guaiac. Each pill contains one-half grain each of antimony and calomel, and one grain of guaiac.

Hydrargyri Cyanidum.—Cyanide of mercury. In white prismatic crystals, soluble in 12·8 parts of water. When muriatic acid is added to the solution, hydrocyanic acid is evolved, made evident by its odor, and bichloride of mercury is left, which is entirely volatilized by heat. Dose, gr. $\frac{1}{20}$—gr. $\frac{1}{6}$.

Hydrargyrum Ammoniatum.—Ammoniated mercury. White precipitate. In white powder or pulverulent masses, decomposed and entirely dissipated by a strong heat, insoluble in water and alcohol, but dissolved without effervescence by muriatic acid.

Unguentum Hydrargyri Ammoniati.—Ointment of ammoniated mercury. Composition : Ammoniated mercury, 10 parts ; benzoinated lard, 90 parts.

Hydrargyri Iodidum Viride.—Green iodide of mercury. A greenish-yellow powder, which becomes red when heated. It is insoluble in water and alcohol. Dose, gr. $\frac{1}{6}$—gr. j.

Hydrargyri Iodidum Rubrum.—Red iodide of mercury. A red powder, which becomes yellow when heated, and red again when cold. It is wholly volatilized by heat, condensing in scales, which are at first yellow, but afterward become red. It is insoluble in water, but is dissolved by boiling alcohol, and by solutions of iodide of potassium and chloride of sodium. Dose, gr. $\frac{1}{30}$—gr. $\frac{1}{10}$.

Unguentum Hydrargyri Iodidi Rubri.—Ointment of red iodide of mercury. Composition : Red iodide, 5 parts ; ointment, 95 parts.

Hydrargyri Sulphuretum Rubrum.—Red sulphuret of mercury. Cinnabar. In brilliant crystalline masses, of a deep-red color and fibrous texture. It is entirely volatilized by heat. When heated with potassa, it yields globules of mercury. It is not soluble in either nitric or muriatic acid, but is dissolved by a mixture of the two. Acetic acid which has been digested with it does not yield a precipitate with iodide of potassium.

Liquor Hydrargyri Nitratis.—Solution of nitrate of mercury. Mercury dissolved in nitric acid. Acid nitrate of mercury. "A transparent, nearly colorless, acid liquid, having the specific gravity 2·100. It is not precipitated by the addition of distilled water ; and the diluted solution affords, with potassa, a dirty-yellow precipitate, and with iodide of potassium a bright-red one, soluble in an excess of the precipitant. When dropped on a bright surface of copper, the diluted solution instantly deposits a coating of mercury."

Unguentum Hydrargyri Nitratis.—Ointment of nitrate of mercury. Citrine ointment.

Unguentum Hydrargyri Nitratis Rubrum.—Brown citrine ointment. (Unofficial.) This differs from the preceding and official citrine ointment, in being made with cod-liver oil. It is dark brown in color, more agreeable in odor, and more efficient as a remedy.

An extemporaneous ointment is prepared by incorporating 10 grs. of yellow oxide with an ounce of vaseline. See page 257.

Antagonists and Incompatibles.—Corrosive sublimate is incompatible with alkalies and their carbonates, lime-water, tartar emetic, nitrate of silver, acetate of lead, albumen, iodide of potassium, soaps, various vegetable infusions, including cinchona. Calomel is incompatible with the alkalies and alkaline earths and alkaline carbonates, with iron, lead, and copper. It should not be given in the same prescription with iodine (forms red iodide), and nitro-muriatic acid should not be prescribed in conjunction with it, lest corrosive sublimate be formed. There is little doubt, also, that calomel is converted into corrosive sublimate by the chlorides of sodium, potassium, and ammonium. The acids and acidulous salts are incompatible with hydrargyrum cum creta.

In cases of poisoning by mercurial salts, especially corrosive sublimate, albumen, white of egg, wheaten flour, milk, etc., may be administered. The white of one egg is considered sufficient for four grains of corrosive sublimate. An excess of albumen may redissolve the compound. Emesis should be promptly induced.

Synergists.—Depressing medicines, antimony, alkalies, especially alkaline chlorides, etc., promote the physiological activity of mercurials.

Physiological Actions.—Metallic mercury in direct contact with the skin or mucous membrane is without action. Swallowed, it is purgative by virtue of its weight. If retained in the intestinal canal, it will form soluble combinations, enter the blood, and produce characteristic systemic effects. Similarly prolonged contact with the skin will be followed by the constitutional action of the drug. Injected into the veins, it will be arrested in the capillaries, producing the usual phenomena of capillary embolism. Mercury gives off vapors at the ordinary temperatures, which have, in notable instances, caused serious constitutional symptoms. As used in the mechanical arts, by gilders and others, the fumes of mercury cause wasting, ptyalism, necrosis of bones, trembling, impaired intellect, and in women, abortion. Without producing such obvious effects as ptyalism, mercurial cachexia, eczema, and disease of the bones, obscure nervous phenomena may result. Among these may be enumerated headache, loss of memory, trembling, defects of co-ordination, disorders of sensation, convulsions, and dementia.

Mercury is readily absorbed—as a vapor by the pulmonary mucous membrane, when applied to the integument, or when taken into the alimentary canal. It probably exists in the blood as an albuminate.

Recent experiments (Wilbouchewitch, Keyes) have shown that mercury, as iron, manganese, and other metals, has the power to increase the number of red corpuscles, and to improve the quality of the blood, provided it is exhibited in small quantities, not often repeated. It has long been known (Liegeois) that this result followed the use of corrosive chloride in syphilis. Schlesinger has recently gone over the question anew with the same result, but he doubts whether the effects are really tonic. It remains true, however, that any considerable quantity of mercury, administered a sufficient time, will affect the quality and composition of the blood; the red globules are diminished in number; the fibrin loses its plasticity; the proportion of water is increased, and various effete materials, whose nature is unknown, accumulate. Mercury is deposited in all the textures, interferes with the normal nutritive processes, and is found in all the secretions and excretions. A marked degree of anæmia, loss of flesh, muscular weakness, intractable ulcerations of the skin, loss of hair, eczema, a foul breath, diarrhœa, the stools being very fetid, are the characteristic symptoms of the action of mercury on the solids and fluids of the body.

This metal has a selective action on the lymphatic glandular system, and notably on the salivary glands and pancreas. Among the earlier symptoms of the action of mercury are an increase of the salivary secretion, an alteration of its quality, fetor of the breath, swollen tongue, soreness of the teeth, a blue or dark slate-colored line along the margin of the teeth, sponginess of the gums, swelling of the parotid, sublingual, and submaxillary glands, aching of the jaws and teeth, with general muscular soreness and aching of the limbs, and some elevation of temperature. To this state are applied the terms *acute mercurialismus*, *ptyalism*, in common language, *salivation*. Mercury certainly stimulates the pancreas; this gland, like the salivary glands, becomes swollen, congested, and pours out an abundant secretion which, however, is not a normal but a pathological secretion. There is little doubt also that mercury increases the action of the intestinal glandular appendages, and thus acts as a purgative. It not only increases the activity of these glands, but is itself in part excreted by them. The products of the increased waste of the tissues caused by mercury are also largely eliminated by the intestinal glands. These actions of mercury should not be regarded as a physiological stimulation of the intestinal glands, in the sense that the foods are stimulant to these organs. The action is pathological, and the products of the action are pathological.

Mercury, like the metals in general, is excreted by the liver, and manifests a tendency to accumulate in this organ. Like the metals in general (iron, manganese, arsenic, copper, etc.), mercury doubtless acts as a stimulant to the hepatic cells, and increases their products. Just as an altered salivary or pancreatic fluid is produced by the action of mercury, so an altered or pathological bile is the result of the stimulation of the hepatic cells by this metal. That its use increases the physiological and normal products of the liver seems an assumption hardly warranted by the facts which have now been accumulated. That mercury (pil. hydrarg., calomel, hydrarg. cum creta), in purgative doses, increases the flow of bile into the intestine—is a cholagogue—can not be successfully disputed; but it is a cholagogue in the sense that croton-oil and the resinous purgatives are: by irritation of the mucous membrane of the duodenum, it causes a reflex contraction of the gall-bladder and hepatic ducts, and an outflow of bile is the result. The presence of alimentary matters in the duodenum suffices to increase the production and discharge of bile; purgatives, for the time being, somewhat more energetically produce the same result. A purgative dose of blue-pill, or calomel, may therefore cause bilious evacuations, but other purgatives may accomplish the same. Repeated stimulation of the liver by mercurials can only result in the production of an altered bile, and may, indeed, cause the organ to strike work, if too long persisted in. If we add to the cholagogue properties of mercury, which it possesses in common with resinous purgatives, the action on the pancreas and the increased elimination of the products of waste by the intestinal glands, we obtain a satisfactory explanation of those powers which have, under the term *alterative*, been heretofore ascribed to mercury.

Mercury is eliminated by the salivary and the intestinal glands, by the liver, but chiefly by the kidneys. A small portion of the metal escapes by the skin also. The excretion of mercury is hastened and completed by the iodide of potassium. As a result of the changes in the composition of the blood, and of the direct action of the metal on the renal epithelium, albuminuria is one of the symptoms present in cases of mercurialism. Without the use of special means to render it soluble, and despite the use of such means, sometimes mercury remains permanently in the organism. When extremely severe cases of salivation were not uncommon, permanent damage to the osseous structures often occurred, and globules of mercury could be shaken out of the dried bones of such subjects. Happily, nowadays, such cases do not occur. The moderate use of mercury, short of ptyalism, does not appear to affect the human system injuriously.

Effects of the Different Preparations.—Hydrargyrum cum creta, calomel, and blue-pill are very similar in action. Calomel, being insoluble, probably escapes solution and combination in the stomach, and is decomposed by the alkaline contents of the small intestine, the oxide of mercury being precipitated. It follows, from this reaction, that the effects of blue-pill and calomel must be similar, and in practice it is found that they correspond closely therapeutically. Salivation more frequently results from the use of blue-pill than the

other mercurials ; and calomel is next in point of activity in this respect.

The corrosive chloride, the red iodide, and the cyanide, are powerful irritant and corrosive poisons. When a poisonous dose of corrosive sublimate has been swallowed, the mucous membrane of the mouth has usually, but not invariably, a whitish, glazed appearance, as if it had been washed over with a strong solution of the nitrate of silver. A sense of constriction of the throat and a strong styptic and metallic taste are experienced. The toxic symptoms follow in a few minutes the ingestion of the poison. Usually, violent pain is felt in the abdomen, but this is not invariable. Vomiting follows, and the vomited matters consist at first of the contents of the stomach, and afterward of mucus streaked with blood. There are usually purging, tenesmus, intestinal cramp, and not unfrequently dysenteric discharges. These evidences of violent gastro-intestinal irritation are accompanied by small, weak pulse, coldness of the surface—but sometimes by a swollen and flushed face — sighing respiration, syncope, insensibility, or convulsions. If the patient survive a few days, ptyalism may occur.

The following are the symptoms of chronic poisoning : abdominal pains ; nausea ; vomiting ; dysenteric diarrhœa ; general weakness, trembling, or paralysis ; ptyalism ; fever ; emaciation, etc. There sometimes occurs a blue line along the margin of the teeth, not unlike that produced by lead.

Suppression of urine is a not infrequent symptom in acute poisoning, and albuminuria is very often present in cases of chronic mercurialismus.

THERAPY.—The acute glandular affections of throat and neck—*tonsillitis*, *parotitis*, *inflammation of the submaxillary and sublingual glands*—are often speedily removed by mercurial preparations. The one twentieth of a grain of calomel, the one fifth of mercury with chalk, may be given every two hours, or one minim of the following solution may be administered at the same interval : ℞ Hydrarg. chlor. corrosiv., gr. j ; aquæ, ʒ j. M. Sig. : Dose, ♏ j. Chronic affections of these organs are not benefited by these remedies, and the so-called scrofulous diseases of the cervical glands are made worse by them.

Corrosive sublimate is an effective remedy in *gastric ulcer*. The thirtieth to the sixtieth of a grain, three times a day before meals, is a proper quantity and occasion for this purpose. Certain kinds of *vomiting* are quickly cured by small doses of calomel. The *vomiting of children*, caused by indigestible food or by constipation, or by these causes combined, is often speedily relieved by one-twelfth-of-a-grain doses of calomel every half-hour or hour, dropped on the tongue. This remedy is the more efficacious when such vomiting is accompanied by

great heat of head, restlessness, and fever. The vomiting of *cholera infantum* is often stopped by the same means.

It has long been held that mercurials are specially indicated in that *catarrhal state of the intestinal mucous membrane and of the hepatic duct*, manifested by nausea, anorexia, tympanites, whitish or clay-colored stools, and jaundice. The use of mercury in these cases is predicated on its supposed power to promote the flow of bile. It is true, no doubt, that calomel and blue-pill will remove these symptoms, but such mild salines as phosphate of soda, sulphate of magnesia, tartrate of soda and potassa, etc., will usually succeed quite as well and without detriment to the patient. The *diarrhœa and dysentery of infants* (ileo-colitis) is frequently treated by minute doses of calomel or hydrargyrum cum creta. When there are much straining and bloody mucus, it is said that small doses of corrosive chloride prove very effective, but the author is convinced that mercurials are much abused in these affections. Children are quickly poisoned by mercurials, although they are not easily salivated. The spinach-colored stools which so frequently occur in the summer complaint of children, and which are, by ignorant practitioners, supposed to be produced by the mercury administered, really belong to cases of ileo-colitis, and may, by their persistence and profuseness, signify an increased irritation of the intestinal mucous membrane due to the remedies given. While the author believes that other medicines are more useful than mercury in the ileo-colitis of children, he is convinced of the utility of minute doses of calomel (one twentieth to one twelfth of a grain every half-hour) when there is much irritability of the stomach. Mercurials are contraindicated in the *diarrhœa and dysentery* of adults, as a rule.

It was formerly an article of faith to hold that mercury was a sovereign remedy in *hepatic disorders*. The state known as *biliousness*, characterized by a yellowish-coated tongue, yellow conjunctivæ, muddy skin, nausea, constipation, may be removed by a mercurial purge when these symptoms are due to catarrh of the duodenum, excesses of the table, sudden checking of the perspiration, etc. The blue-pill, or mercury with chalk, or calomel, succeeds in these cases by removing offending substances from the intestinal canal, by relieving a catarrhal state of the mucous membrane, or by causing elimination of waste products by the intestinal glandular apparatus. Less objectionable agents may be employed with equal success.

The experience of the India medical officers has shown conclusively that mercurials are harmful in *acute hepatitis*, *hepatic abscess*, *jaundice from gall-stones*, *acute yellow atrophy*, etc. As these affections are very rife in India, an experience which has led to such conclusions should be heeded. There is no evidence to show that mercurials render the least service in *cirrhosis*.

Calomel is a very efficient *purgative*. It will be retained when