

als are unquestionably the most important. The metallic disks or coins are placed as a bracelet around the limb to be acted on, or individual disks are held in position by a bandage. The effects follow in a few minutes. The skin, previously pallid, cold, and without sensibility, becomes flushed, warm, and acutely sensitive, and in a short time the special senses are restored to their normal functional activity. As has been described, corresponding losses occur on the other side.

Metallotherapy has been employed chiefly for the restoration of sensibility in cases of the *hemianæsthesia of hysteria*, of *paralysis of sensibility*, in some instances of hemiplegia, and of certain functional *paralyses of motility*. It is not possible to formulate a set of rules for distinguishing the cases which will be benefited by these applications. Sometimes remarkable results are reached in a few applications; then, again, unaccountable failures occur.

Cases of *writer's cramp*, and of *chorea*, among the spasmodic affections, and *neuralgia*, have been suddenly cured by the use of the esthesiogenic metal; but failures are greatly more frequent than the successes. When the metal to which the patient is sensitive has been ascertained, the further treatment may be conducted by the internal use of the same.

#### Authorities referred to :

[The literature of this subject is now so extensive, that its enumeration would occupy space entirely out of proportion to its utility here. A few of the more important contributions are given.]

BURQ, M. *Thèse de Paris*, quoted in *Bull. Gén. de Thérap.*, vol. xvii, p. 33.

PERKINS, BENJAMIN DOUGLAS, M. A., son of Dr. Perkins the discoverer. *The Efficacy of Perkins's Patent Metallic Tractors in Topical Diseases*, etc., London, 1800.

PETIT, DR. L. H. *Sur la Metallothérapie*. *Bull. Gén. de Thérap.*, vols. xvii, xviii. A series of papers.

TUKE, DR. HACK. *Metalloscopy and Expectant Attention*. *Journal of Mental Science*, January, 1879, p. 598.

VIGOUROUX, DR. *Le Progrès Médical*, December 7, 1878, p. 944.

WESTPHAL, PROF. DR. *Berliner klinische Wochenschrift*, July 29, 1878.

Alumen.—Alum. *Alun*, Fr.; *Alaun*, Ger.

*Aluminis et Potassii Sulphas*.—Potassa alum. A white, slightly-efflorescent salt, crystallizing in regular octahedrons, and possessing an acid, sweetish, astringent taste. It dissolves in from fourteen to fifteen times its weight of cold, and three fourths of its weight of boiling water, but is insoluble in alcohol.

*Alumen Exsiccatum*.—Dried alum. Alum deprived of its water of crystallization by heat. A white, granular powder, odorless, but having a sweetish, astringent taste. Slowly but completely soluble in twenty parts of water at 60° Fahr.

*Aluminis Sulphas*.—Sulphate of aluminum. Has a sour, somewhat

sweetish, and astringent taste, and an acid reaction. It is soluble in twice its weight of water.

ANTAGONISTS AND INCOMPATIBLES.—Alkalies and their carbonates and acetate of lead are chemically incompatible.

SYNERGISTS.—The mineral and vegetable astringents promote its therapeutical activity.

PHYSIOLOGICAL ACTIONS.—The sweetish taste of alum first experienced is quickly followed by a decided astringency. It provokes an abundant flow of saliva, and the albumen of the saliva and buccal mucus is coagulated in whitish, membrane-like flakes. Contraction of the capillaries, blanching of the mucous membrane, and subsequent diminution of secretion, take place; hence the dryness of the throat, thirst, and constipation, which result from its use. In doses of a teaspoonful, or more, alum is an efficient emetic. Under certain morbid states it also proves laxative. Notwithstanding its power to coagulate albumen, it is absorbed into the blood, as was shown by Orfila, and may be found in the liver and in the urine. Circulating in the blood, alum affects the capillaries, diminishing their caliber, lessens secretion, especially of the mucous membranes, and arrests hæmorrhage. In very large doses alum produces decided irritant effects—nausea, vomiting, abdominal pain, diarrhœa, etc.

Dried alum, in consequence of its strong affinity for water, and its power to coagulate albumen, is a mild escharotic.

THERAPY.—Alum is one of the remedies which may be used in *gastric catarrh*. It is said to be most effective when there is vomiting of glairy mucus. ℞ *Aluminis*, ʒ ij; *extract. gentian.*, ʒ ss. M. Ft. pil. no. xxx. Sig.: *Two pills three times a day*. Alum is a serviceable hæmostatic in *hæmatemesis*. It is, of course, adapted only to cases of passive hæmorrhage, when there is a relaxed condition of the mucous membrane. Other astringents—as, for example, Monsel's salt—are more effective. When *intestinal hæmorrhage* is dependent on mechanical causes (cirrhosis, for example), and the mucous membrane is free from acute inflammation, alum is a serviceable astringent. It was formerly much used in *chronic diarrhœa* and *chronic dysentery*, but more effective agents are now employed in these diseases. The following formulæ are applicable to the above-mentioned diseases, in the absence of more suitable agents: ℞ *Aluminis*, ʒ ij; *pulv. aromat.*, ʒ j; *pulv. opii*, grs. vj—grs. xij. M. Ft. *pulv. no. vj*. Sig.: *One powder in honey or sirup three times a day or oftener*. ℞ *Aluminis*, ʒ j; *extract. opii*, grs. x; *catechu*, ʒ j. M. Ft. pil. no. xx. Sig.: *Two pills every two, three, or four hours*. ℞ *Aluminis*, ʒ ij; *pulv. opii*, grs. iij—grs. vj; *pulv. kino*, ʒ j; *sacch. lactis*, ʒ j. M. Ft. *pulv. no. vj*. Sig.: *One powder every three hours*.

It is a singular fact that the most effective agent for the cure of *colica pictorum* is alum. It relieves the pain and nausea, and over-

comes the constipation, more certainly than any other agent. The chemical theory of its action is entirely unequal to the explanation of its remarkable effects; the conversion of any portion of the lead present in the intestinal canal into the insoluble sulphate would not suffice to quiet pain, relieve flatulence, and relax the obstinately constipated bowels. Its action is doubtless dynamical: it overcomes the relaxation and paresis of the muscular layer, on which the phenomena of lead-colic depend. The following are convenient formulæ for the administration of alum in this disease: ℞ Aluminis, ʒ ij; acid. sulphuric. dil., ʒ j; syrup. limonis, ʒ j; aquæ, ʒ iij. M. Sig.: *A tablespoonful every hour or two.* ℞ Aluminis, ʒ ij; vini, ʒ iv; catechu, ʒ j; tragacanthæ, ʒ j; aquæ, ʒ viij. M. Sig.: *A tablespoonful every hour.* Alum-whey, prepared as follows, may be used in lead-colic: To a pint of boiling milk, add ninety grains of alum-powder; separate the curd, and sweeten the whey if desired with an ounce of white sugar. A wineglassful may be taken every hour or two.

Alum not unfrequently affords relief in *gastralgia*, *enteralgia*, and *catarrh of the intestines*. It is a serviceable laxative in females of lax fiber, in whom constipation depends upon a parietic state of the muscular layer of the bowel. It is true that we possess many other agents more agreeable for administration, and also more effective; but alum is cheap, and always to be obtained.

Alum, dissolved in infusion or solution of the extract of logwood, is a useful injection in *hæmorrhage from the rectum*, or as an application to *bleeding piles*, or as an astringent wash in *prolapsus of the rectum in children*. A crystal of alum, cut into a globular shape, may be passed into the rectum in such cases. The following ointment may be applied to hæmorrhoids when they protrude, bleed, and are painful: ℞ Pulv. aluminis, ʒ ij; pulv. camphoræ, pulv. opii, āā ʒ j; unguent., ʒ j. M. Sig.: *Ointment.*

Notwithstanding the theoretical objections which have been made as to its utility, the use of alum is sanctioned by high authority in *hæmorrhages* from distant organs of the body. Oppolzer recommends the following formula: ℞ Aluminis, amyli, āā ʒ j; sacchari, ʒ ij. M. Ft. pulv. no. vj. Sig.: *One powder every two hours.* Skoda advises the following formula in *hæmoptysis*: ℞ Aluminis, ʒ j; sacch. alb., ʒ ss; pulv. ipecac. comp., ʒ j. M. Ft. pulv. no. vj. Sig.: *One powder every two hours.*

Alum was formerly used in *diabetes mellitus*, but more effective methods of treatment have taken its place. Good results have certainly been produced by the use of alum in *diabetes insipidus*. *Colligative sweats* are moderated by the internal use of alum, and by sponging the surface with a solution.

Alum has been used with a certain measure of success in *whooping-cough*, during the spasmodic stage, but the more certain and pal-

atable remedies now in our possession have quite displaced it. As an *emetic in croup*, there is no doubt of the utility of alum. It is used to cause the dislodgment of the false membrane, and to prevent its re-formation. It acts without depressing the bodily functions, is prompt and thorough. A teaspoonful of the powder, mixed with honey or sirup, may be given, and repeated every half-hour until free emesis occurs.

EXTERNAL USES OF ALUM.—A solution of alum in nitric ether is said to be an effective application in *toothache* (ʒ ij—ʒ vij). When the *gums are spongy and ill-conditioned*, and manifest a tendency to recede from the teeth, the following local application is very serviceable: ℞ Aluminis, ʒ j; vini, ʒ j; tinct. cinchonæ, ʒ ss; tinct. myrrhæ, ʒ ij; mel. rosæ, ʒ ij. M. Sig.: *As a mouth-wash.* When there is much relaxation of the faucial mucous membrane, alum and sugar, in equal proportions, may be applied by an insufflation-tube. Powdered alum, dusted over the affected surface, is a useful application in *chronic pharyngitis*, *chronic tonsillitis*, *chronic nasal catarrh*. *Ulcers of the mouth*, whether syphilitic, or due to nursing, or arising from gastric disorder, are improved in character by application of a crystal of alum. A useful gargle in various affections of the mouth and throat is the following: ℞ Infus. lini, ʒ xv; tinct. kino, ʒ j; aluminis, ʒ ij. M. Sig.: *As a gargle.*

In *catarrhal ophthalmia*, after the acute symptoms have subsided, an alum-lotion is useful: ℞ Aluminis, ʒ j; aquæ rosæ, ʒ iv. M. Sig.: *Lotion.* Alum-curd is a domestic application which is often serviceable: ʒ ss of alum to the white of an egg.

The following is a useful injection in *chronic gonorrhœa*: ℞ Aluminis, ʒ j; zinci sulphatis, ʒ ss; sodii biborat., grs. iv; aquæ rosæ, ʒ viij. M. Sig.: *An injection.* This prescription is equally applicable to *leucorrhœa*.

Alum is a useful *hæmostatic*, but there are others more powerful. Alum is a constituent of the once famous Pagliari's mixture (Mentel's): ℞ Benzoini, gr. c; alcohol. fort., ʒ ss. Dissolve and add water, ʒ x; alum, ʒ j. The mixture is to be boiled until clear, and, when cool, filtered. This is also a good preservative solution for anatomical preparations, and is an effective application in *leucorrhœa*, *pruritus of the vulva*, etc.

Alum ʒ ss, the whites of four eggs, and tincture of camphor ʒ ij, is an excellent application to *bed-sores*. Burned alum is a mild escharotic, which is sometimes used to destroy *exuberant granulations*.

#### Authorities referred to:

- GUBLER, DR. A. *Commentaires de Thérapeutique*, etc., p. 433.  
 NOTHNAGEL, DR. HERMANN. *Handbuch der Arzneimittellehre*, p. 311.  
 TROUSSEAU ET PIDOUX. *Traité de Thérap.*, etc., vol. i, p. 188.  
 WALDENBURG UND SIMON. *Handbuch der Arzneiverordnungs-Lehre*, p. 154.

**Acidum Tannicum.**—Tannic acid. *Tanin*, Fr.; *Tanninum*, Ger.

Tannic acid has a yellowish-white color, and strongly astringent taste. It is soluble in 6 parts of water, in 0.6 part of alcohol, and in 6 parts of glycerin. Its solution reddens litmus, and produces, with solution of gelatin, a white, flocculent precipitate; with the salts of the sesquioxide of iron a bluish-black precipitate; and with solutions of the alkaloids white precipitates, very soluble in acetic acid. Dose, gr. j— $\mathcal{D}$ j.

**Colloidium Stypticum.**—Styptic collodion. (Tannic acid, 20 parts; alcohol, 5 parts; stronger ether, 20 parts; collodion, 55 parts.)

**Trochisci Acidi Tannici.**—Troches of tannic acid. (Each troche contains one grain of tannic acid.)

**Unguentum Acidi Tannici.**—Ointment of tannic acid. (Tannin, 10 parts; benzoinated lard, 90 parts.)

**Suppositoria Acidi Tannici.**—Suppositories of tannic acid. (Not official.) (Tannin, 3 j; ol. theobromæ, 3 v.)

**Acidum Gallicum.**—Gallic acid. *Acide gallique*, Fr.; *Galläpfel-saure*, Ger.

Gallic acid is in small, silky, nearly colorless crystals, having a slightly acid and astringent taste. It is soluble in one hundred parts of cold, and in three of boiling water. The solution reddens litmus, and does not produce a precipitate with a solution of gelatin, or of sulphate of protoxide of iron. With solutions of salts of sesquioxide of iron, it produces a bluish-black precipitate, the color of which disappears when the liquid is heated. It is decomposed by a strong heat, and entirely dissipated when thrown on red-hot iron. Dose, gr. j—grs. x.

**Unguentum Acidi Gallici.**—Ointment of gallic acid. (Gallic acid, 10 parts; benzoinated lard, 90 parts.)

The following remedies contain a tannic acid, and have physiological and therapeutical actions due to the presence of this substance:

**Galla.**—Nutmeg. *Noix de galle*, Fr.; *Galläpfel*, Ger.

**Tinctura Gallæ.**—Tincture of galls. Dose, 3 ss—3 ij.

**Unguentum Gallæ.**—Ointment of galls. (Galls in fine powder, 10 parts; benzoinated lard, 90 parts.)

COMPOSITION.—Tannic acid (gallo-tannic), 60 to 70 per cent; gallic acid, 3 per cent; sugar, resin, etc.

**Catechu.**—Catechu. An extract prepared principally from the wood of *Acacia catechu*. *Cachou*, Fr.; *Katechusafe*, Ger.

**Tinctura Catechu Composita.**—Tincture of catechu. (Catechu, 12 parts; cinnamom., 8 parts; diluted alcohol, a sufficient quantity to make 100 parts.) Dose,  $\mathfrak{m}$  x—3 j.

**Infusum Catechu Compositum.**—Compound infusion of catechu. (Not official.) (Catechu,  $\frac{3}{4}$  ss; cinnamon, 3 j; boiling water, Oj.) Dose, 3 j— $\frac{3}{4}$  ss.)

**Trochisci Catechu.**—Troches of catechu. Each troche contains one grain of catechu.

COMPOSITION.—Catechin, or catechuic acid.

**Kino.**—Kino. The inspissated juice of *Pterocarpus marsupium*, and of other plants. *Kino de l'Inde*, Fr.; *Kino Gummi*, Ger.

**Tinctura Kino.**—Tincture of kino (10 parts to 100). Dose,  $\mathfrak{m}$  x—3 ij.

COMPOSITION.—Kino-tannic acid.

**Krameria.**—Rhatany. The root of *Krameria triandra* and of *K. tomentosa*. *Ratanhia*, Fr.; *Ratanhiawurzel*, Ger.

**Extractum Kramerie.**—Extract of rhatany. Dose, grs. v—grs. x.

**Tinctura Kramerie.**—Tincture of rhatany (20 parts to 100). Dose,  $\mathfrak{m}$  v—3 j.

**Extractum Kramerie Fluidum.**—Fluid extract of rhatany. Dose,  $\mathfrak{m}$  v—3 ss.

COMPOSITION.—Ratanhia-tannic acid; odorous principle; wax, gum, etc.

**Hæmatoxylin.**—Logwood. The heart-wood of *Hæmatoxylin Campechianum*. *Bois de Campêche*, Fr.; *Campecheholz*, Ger.

**Decoction Hæmatoxyli.**—Decoction of logwood. (Not official.) (Logwood,  $\frac{3}{4}$  j; water, Oij, boiled down to Oj.) Dose,  $\frac{3}{4}$  ss— $\frac{3}{4}$  j.

**Extractum Hæmatoxyli.**—Extract of logwood. Dose, gr. v— $\mathcal{D}$ j.

COMPOSITION.—Hæmatoxylin, tannic acid, etc.

**Geranium.**—Cranesbill. The rhizoma of *Geranium maculatum*.

**Extractum Geranii Fluidum.**—Fluid extract of geranium. Dose,  $\mathfrak{m}$  v—3 j.

COMPOSITION.—Tannic and gallic acids, resin, gum, starch, chlorophyll, etc.

**Quercus Alba.**—White-oak bark.

**Quercus Tinctoria.**—Black-oak bark. (Not official.) *Écorce de chêne*, Fr.; *Eichenrinde*, Ger.

**Decoction Quercus Albæ.**—Decoction of white-oak. (Not official.) ( $\frac{3}{4}$  j—Oj.) Dose,  $\frac{3}{4}$  ss— $\frac{3}{4}$  j.

COMPOSITION.—Quercitrin or quercitric acid, tannic acid, etc.

*Rosa Gallica*.—Red rose. The petals of *Rosa Gallica*. *Roses rouges*, Fr.; *Essigrosen*, Ger.

*Confectio Rosæ*.—Confection of rose.

*Extractum Rosæ Fluidum*.—Fluid extract of rose. Dose, ℥ v—3 ij.

*Mel Rosæ*.—Honey of rose.

COMPOSITION.—Tannic and gallic acids, quercitrin, coloring matter, volatile oil, etc.

*Rubus*.—Blackberry-root. Bark of the root of *Rubus Canadensis* and *Rubus villosus*.

*Extractum Rubi Fluidum*.—Fluid extract of rubus. Dose, ℥ x—3 ij.

Aromatic sirup of blackberry, which is not official, contains blackberry-root, cinnamon, cloves, and mace. A fluid ounce contains the strength of thirty grains of the root.

COMPOSITION.—Tannic acid, etc.

*Myrica Cerifera*.—Bayberry, wax-myrtle. (Not official.) Bark of the stem and root.

Decoction is made by boiling an ounce in a pint of water—dose, ℥ ss—℥ j. An alcoholic extract (*myricine* of the eclectics)—dose, grs. v; and a fluid extract—dose, ℥ ss—3 ij—are to be obtained in the shops.

COMPOSITION.—Tannic and gallic acids, myricinic acid, resin, red coloring matter, etc.

The most important property is the astringency due to the large quantity of tannic and gallic acids. In large doses it is emetic.

*Statice Limonium*.—Marsh rosemary. (Not official.) The root. A decoction (℥ j—Oj) may be used—dose, ℥ ss—℥ j. A fluid extract is prepared—dose, ℥ xx—3 j.

COMPOSITION.—Tannic acid (twelve per cent), gum, extract, etc.

*Alnus Serrulata*.—Common alder. (Not official.) The bark in decoction (℥ j—Oj)—dose, ℥ ss—℥ j. Fluid extract—dose, ℥ x—3 j. Alcoholic extract (*almin* of the eclectics)—dose, gr. j—grs. v.

COMPOSITION.—Tannic acid, oil, resin, etc.

*Heuchera*.—Alum-root. Root of *Heuchera Americana*. (Not official.) Decoction—dose, ℥ ss—℥ j; fluid extract—dose, ℥ x—3 j.

COMPOSITION.—Tannic acid, etc.

*Hamamelis*.—The leaves of *Hamamelis Virginica*. Witch-hazel. *Extractum Hamamelidis Fluidum*.—Fluid extract of *hamamelis*. Dose, ℥ x—3 ij.

COMPOSITION.—Tannic acid, odorous matters, etc.

*Nymphæa Odorata*.—Sweet-scented water-lily. Root. Decoction (℥ j—Oj)—dose, ℥ ss—℥ j. Fluid extract—dose, ℥ ss—3 j. (Not official.)

COMPOSITION.—Tannic acid, gallic acid, etc.

*Castanea*.—Leaves of *Castanea vesca* Linné (Nat. Ord. *Cupuliferae*), collected in September or October, while still green. (U. S. P.)

COMPOSITION.—Tannic acid, etc.

ANTAGONISTS AND INCOMPATIBLES.—The mineral acids, the salts of antimony, lead, and silver, and the persalts of iron, and alkalis, are chemically incompatible. The vegetable alkaloids and gelatin form insoluble precipitates.

SYNERGISTS.—Tonics and bitters, as a rule, favor the action of tannic and gallic acids, and of the substances containing them. The agents comprehended in this group—or remedies whose chief result is to increase waste—are synergistic.

PHYSIOLOGICAL ACTIONS.—Tannin has a bitter astringent taste, and constricts the mucous membrane. In the stomach it enters into combination with albumen, and with the pepsin of the gastric juice, which it precipitates from its solution. Tannin, therefore, impairs digestive power by rendering the pepsin inoperative. It diminishes secretion of the mucous membrane by virtue of its power to contract the caliber of the vessels, and it restrains peristalsis by its action on the muscular layer; hence the constipating effects which follow its use. If long continued in considerable quantity, tannin disorders digestion, sets up irritation of the mucous membrane, and gives rise to a febrile state and to wasting of the tissues.

Having such affinity for and coagulating action on albumen, it is obvious that tannin must diffuse into the blood with difficulty. A part undergoes conversion into gallic and pyrogallic acids in the stomach, and in this form is absorbed. Injected into the veins, tannic acid coagulates albumen, and the results which follow are due to multiple embolisms. Elimination of tannin takes place by the intestinal canal and by the kidneys, in the form of gallic and pyrogallic acids.

THERAPY.—*Catarrh of the stomach, a relaxed state of the mucous membrane, acidity, and flatulence*, are conditions in which tannic acid is useful. It may be given in pill-form with sufficient glycerin to make a mass of proper consistence—one drop to four grains. *Hæmatemesis* dependent on ulcer of the stomach, or obstructive disease of the liver, and not inflammatory in origin, is an indication for tannin. It should be given in solution and in a large dose—grs. x—℥ j. Tannic acid is an efficacious remedy in *diarrhoea*, after acute symptoms have subsided, in *chronic diarrhoea*, *colliquative diarrhoea*, the *diarrhoea*