

in cases of *chronic pharyngitis*, there is dryness of the mucous membrane. From ten to thirty minims of the fluid extract, or a half to one drachm of the tincture, *ter in die*, is a successful remedy for an extremely obstinate affection, namely, chronic pharyngitis—the mucus adhering in large, thin, dry scales, and the mucous membrane being glossy, shining, glazed, and dry.

The active principle (xanthoxylum) is a useful *stomachic tonic* in atonic dyspepsia. When, however, in stomach, intestinal, or hepatic disorders the object is to promote secretion, the preparations of xanthoxylum must be used. *Jaundice due to catarrh of the bile-ducts*, and that form of *jaundice produced by acute malarial poisoning*, are conditions in which xanthoxylum is distinctly remedial. *Constipation, due to deficient secretion*, is also removed by this agent.

Xanthoxylum has long had a deserved reputation in the treatment of *chronic rheumatism*. It is adapted to *muscular rheumatism, myalgia*, and such local muscular disorders as *torticollis* (recent cases), *lumbago*, etc. It may be used with advantage, locally, in these affections. The curative power which it possesses in chronic rheumatism is doubtless due to its eliminant action on the mucous and cutaneous surfaces.

Xanthoxylum is a remedy for *constitutional syphilis* of equal merit with guaiac, mezereon, stillingia, etc., and is greatly more effective than sarsaparilla.

Decoction of xanthoxylum has been used with success in the treatment of *dropsy*.

Fraxinus Americana.—The inner bark of the root. (Not official.)

PREPARATION.—*Vinum Fraxini*. The inner bark of the root collected in November, eight ounces; stronger white wine, or sherry, two pints. The root-bark should be macerated in the wine three or four days; after percolation, to every 25 parts there should be added 2 parts of glycerin and 1 part of alcohol. The dose of the wine thus prepared is a teaspoonful or two, three times a day, before meals.

ACTIONS AND USES.—There has been no adequate study of the physiological actions of fraxinus. Its employment is, thus far, merely empirical. We owe to Dr. Charles P. Turner, of Philadelphia, the knowledge now in our possession regarding its therapeutical powers. It belongs to the group of alterative medicines, if we may still use this rather obsolete term. Administered in certain diseases, it modifies the local morbid process, or cures it without any recognizable disturbance of the functions. The chief use of it thus far has been in the treatment of certain uterine disorders. Dr. Turner has found it to have a curative action in *chronic metritis*, and in the disorders consequent on this condition of the uterus. In the various forms of *dysmenorrhœa*, especially the congestive variety, it has proved to be very effective. Lest disappointment may be experienced from its use, we assure our

readers that the administration of the wine must be kept up for several weeks or months. When administered for dysmenorrhœa, it should be taken diligently in the interval, and when given for metritis, it should be taken assiduously for several months.

Authorities referred to :

HUSEMANN, DR. AUG. UND THEO. *Die Pflanzenstoffe*, pp. 80, 717, 1108.

PORCHER, DR. F. PEYRE. *Resources of the Southern Fields and Forests*, p. 161.

AGENTS HAVING THE POWER TO ARREST SEPTIC PROCESSES, AND TO DESTROY THE FERMENTS OR THE MINUTE ORGANISMS (DISEASE-GERMS), ON THE PRESENCE OF WHICH THEIR ACTIVITY DEPENDS.

ANTISEPTICS.

THOSE remedies are entitled *antiseptic* which are employed to arrest fermentative processes. It is now generally admitted that every kind of fermentation is correlative of the growth and multiplication of a living organism. In various diseases, microzymes, vibrio, bacteria, either stand in a causative relation to the morbid process, or are necessary to its evolution and development. As an exemplification of the influence exerted by these minute organisms in diseased states, I may mention the bacteria of Oertel, which are formed in such immense numbers, and attain to such wide diffusion in diphtheria; the protomyces of Obermeier, which play so important a rôle in relapsing fever; the bacillus malariae of Klebs and Tomassi-Crudeli; the bacillus tuberculosis of Koch, and the specific bacteria (cacobacteria) found by Burdon-Sanderson in the exudation of septic inflammation of the peritonæum. Disease-germs, which may not exist in definitely-organized forms, are, at least, constituted of living matter, having properties apparently similar to those ferments with which chemistry has made us acquainted. Increased importance is given to the subject of ferments, by the discovery of *ptomaines*—alkaloidal substances found in the body after death—and by those poisons generated in the course of the septic diseases which have, apparently, a similar genesis. Although for many specific and communicable diseases the pathogenetic germs remain unknown, sufficient facts have been collected to justify the theory of the existence of such organisms.

The remedies of this group—antiseptica—have the power, when brought into contact with the minute organisms or disease-germs mentioned above, to destroy their vitality, and to arrest the fermentation process, or zymosis, which they either initiate or promote. There is a distinct relation between the antiseptic and antipyretic properties of

various members of this group, and they have the power to depress temperature in the same ratio that they are active in destroying disease ferments and germs. Some of these remedies, e. g., quinine, sulphurous acid, the sulphites, etc., have already been discussed in Part II. Under this head there remain for consideration several important agents whose applications are distinctly antiseptic.

Oxygenium.—Oxygen. *Oxygène*, Fr.; *Sauerstoff*, Ger. (Not official.)

PREPARATION.—The most convenient mode of preparing oxygen for medical purposes is to heat in a gun-barrel-shaped brass or iron retort a mixture composed of five parts of chlorate of potassium and one part of binoxide of manganese. When heated to dull red, the chlorate yields up its oxygen, being reduced to chloride. The gas may be most conveniently collected over water, which dissolves but little of the oxygen, but takes up all the chlorine that may be accidentally present.

It is a permanent, elastic gas, inodorous, without taste, incombustible, but uniting with bodies in a state of combustion. It is very slightly soluble in water at the ordinary temperature and pressure.

DOSE.—The quantity of oxygen which may be inhaled, in the ordinary medicinal applications of this gas, ranges from one to five gallons. The simplest apparatus will suffice, but an elastic bag, with a suitable mouth-piece, is usually employed for this purpose.

PHYSIOLOGICAL ACTIONS.—If the important rôle which oxygen plays in the economy of Nature furnished a measure of its powers when administered as a remedy, it would be a most important therapeutic agent. When inhaled in the pure state (not as air), it produces singularly little constitutional disturbance. A sensation of warmth in the larynx, trachea, and bronchi, is first experienced; the pulse, as a rule, somewhat increases, though it may be lessened in frequency; a sense of mental exhilaration and a disposition to greater bodily activity are produced; the appetite becomes keener; but no constant influence on the excretions has been noted (Demarquay). Experiments on animals have demonstrated that the inhalation of oxygen *per se* does not have an injurious effect on animal life (A. H. Smith). On the contrary, as Hayem has recently shown, the administration of oxygen in from forty to ninety litres per day, given in two doses and mixed with a determinate quantity of air, energizes to a considerable degree the nutritive functions; it increases the appetite, slightly elevates the temperature, stimulates the cardiac movements, and augments the body-weight. These results are due in the main to the effect of oxygen on the blood; it increases the number and stimulates the organic activity of the red blood-globules. Although this action is not constant, the effects may become so by the greater nutritional changes which are thus promoted. When the inhalations are sus-

pending, these effects on the blood cease. Anne's results, obtained by a course of experiment on himself, entirely confirm those obtained by Hayem.

THERAPY.—Oxygen is indicated and has been used with success in diseases of the respiratory organs, characterized by *dyspnœa*, due to causes interfering with the oxygenation of the blood, in *emphysema*, *asthma*, *croup*, *asphyxia*, *chloroform narcosis*, *asphyxia from toxic gases*, etc. In these cases oxygen acts in a manner which is perfectly obvious: the labor of breathing and the damage to the respiratory center are lessened by the addition to the blood of oxygen in larger quantity than is supplied by the air. In these cases, pure oxygen, or a mixture of one part of the gas to two or three of air, may be employed. The more extreme the *dyspnœa*, the greater the necessity for undiluted oxygen.

Oxygen is also indicated, and has been successfully employed, in certain diseases characterized by insufficient oxidation: *chlorosis*, *anæmia*, *leucocythemia*, *diabetes*, *albuminuria*, etc. In such cases the internal administration of chalybeate medicines, or mineral waters, should accompany the inhalations of oxygen. Pure oxygen is not necessary; an admixture with three parts of air will suffice, and the inhalation should be made morning and evening.

The evidence is satisfactory that oxygen-inhalations produce good results in some cases of *phthisis*. Those cases appear to be most benefited in which emaciation, dyspeptic symptoms, etc., have occurred, without marked change in the condition of the lungs. When hectic fever comes on, and excavations have occurred, the utility of oxygen has ended, except as a palliative of *dyspnœa*. Pinard reports a case of *vomiting of pregnancy*, uncontrollable by other means, promptly arrested by oxygen inhalations. Hayem gives similar facts, and also reports the good effects of this remedy in *gastralgia*, *dyspepsia*, and other functional disorders of the stomach. In *cancer*, *chronic catarrh*, and dilatation of the stomach, it affords relief without having a curative action.

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Chlorinium.—Chlorine. *Chlore*, Fr.; *Chlor*, Ger. (Not official.)

PROPERTIES.—Chlorine is a greenish-colored gas, of a persistent, penetrating, suffocating, and characteristic odor. It is soluble in water in the proportion of two volumes (of gas) to one.

Aqua Chlorig.—Chlorine-water is a greenish-yellow liquid, possessing the suffocating odor of chlorine.

Liquor Sodæ Chloratæ.—Solution of chlorinated soda. A transparent liquid, of a greenish-yellow color, having a slight odor of chlorine, a sharp, saline taste, and an alkaline reaction.

Calx Chlorata.—Chlorinated lime. Chloride of lime. A grayish-white substance, in powder or friable lumps, dry or but slightly moist, and nearly entirely dissolved by dilute muriatic acid, with the escape of chlorine. It should contain at least 25 per cent of chlorine.

PHYSIOLOGICAL ACTIONS.—Chlorine as a gas, or in solution in water, is an active irritant. Applied to the skin for some minutes, it causes heat and burning, increased diaphoresis, and, if the contact be sufficiently prolonged, vesication. Inhaled in very small quantity, largely diluted with air, this gas induces a sensation of warmth in the chest, and increases the bronchial mucus. In considerable quantity it is a violent irritant, excites spasm of the glottis, and sets up active inflammation of the larynx, bronchi, and lungs.

Chlorine is without action when moisture is not present. Water is decomposed by it, chlorhydric acid is formed, and oxygen set free as active oxygen or ozone. The antiseptic and antiferment properties of chlorine are, therefore, due to the oxidizing powers of the liberated ozone. The sulphur and phosphorus compounds with hydrogen are decomposed by chlorine. When this gas is brought into contact with sulphureted hydrogen, chlorhydric acid is formed and sulphur is precipitated. On these chemical facts rest the deodorant and disinfectant powers of chlorine. Binz has lately made an elaborate study of the effects of chlorine, and he finds that in animals it has a distinct narcotic effect; that it suspends the functions of the cerebrum, but does not impair the contractility of muscle, or the irritability of nerves.

THERAPY.—Chlorine gas will arrest putrefactive decomposition of animal matters, and may, therefore, be employed as a preservative of *anatomical preparations*. As a deodorant and disinfectant it may be used to destroy *foul effluvia* and *disease-germs*. It is irrespirable in sufficient quantity to affect disease-germs in the living subject, and it destroys the colors and even texture of fabrics, so that it is rarely used for disinfection of the person or of the clothing of patients.

Chlorine-water, chlorinated soda, and solutions of chlorinated lime, are employed locally in *scarlet fever*, *diphtheria*, *aphthæ*, and *gangrene of the mouth and fauces*. Their chief utility consists in removing fetor, but they probably, also, exert a toxic influence on disease-germs. \mathfrak{R} *Aquæ chlorig*, \mathfrak{z} ss; *aquæ destil.*, \mathfrak{z} ijss; *syrupi simpl.*, \mathfrak{z} ss. M.

Sig.: As a gargle or lotion for the mouth. \mathfrak{R} *Calc. chloratæ*, \mathfrak{z} ss; *mucilaginis*, \mathfrak{z} ss; *aquæ destil.*, \mathfrak{z} ijss. M. *Sig.*: *Lotion*. To correct fetor of the breath, the following formula may be used: \mathfrak{R} *Calcis chlorat.*, \mathfrak{z} ij; *aquæ destil.*, *alcoholis*, \mathfrak{aa} \mathfrak{z} ij; *ol. rosæ*, gtt. iv. M. *Sig.*: A teaspoonful to a tumblerful of water.

Chlorine-water was formerly much employed in *scarlet fever*, *typhoid*, *typhus*, etc. Its use in these affections was predicated on its presumed power to arrest the zymosis of the morbid ferments. It need hardly be stated that such notions are no longer entertained.

These chlorine preparations are unquestionably serviceable as detergent, deodorant, and antiseptic applications to *sloughing and gangrenous wounds*. A solution of chlorinated soda is employed to prevent infection by animal poisons, the *bite of serpents and insects*, and the *sypilitic virus*.

Formerly chlorine-water and chlorinated soda were used in *chronic hepatic affections*, but there is no evidence that they are serviceable.

The toxic effects of chlorine gas may be prevented by ammoniacal gas, forming ammonium chloride. Albumen is the most suitable and convenient antidote to the chlorine preparations taken into the stomach. It should be given freely in the form of milk, eggs, flour, etc.

Bromum.—Bromine. *Brome*, Fr.; *Brom*, Ger. A dark-red liquid, having a strong, disagreeable odor. It is sparingly soluble in water, more soluble in alcohol, and still more so in ether.

PHYSIOLOGICAL ACTIONS.—The actions of bromine, considered from the chemical point of view, are similar to those of chlorine; it decomposes hydrogen compounds, forming bromhydric acid, and precipitating or separating the element associated with hydrogen. It is therefore a deodorant and antiseptic. The vapor of bromine is intensely irritant to the air-passages. It combines with the water and sets free ozone, which energetically attacks the mucous membrane. In sufficient quantity, laryngitis, bronchitis, and pneumonia will be produced by the inhalation of its vapor. Applied in the liquid form, and undiluted, bromine acts as an energetic and very painful escharotic. A brownish slough is formed, which is afterward slowly detached. Internally, by the stomach, bromine acts as a corrosive poison, producing violent gastritis, and the phenomena of depression and collapse, which attend the action of corrosive poisons in general.

THERAPY.—The vapor of bromine is an efficient remedy in *acute coryza* and *hay-asthma*: \mathfrak{R} *Bromi*, \mathfrak{z} ss; *alcoholis*, \mathfrak{z} iv. M. *Sig.*: *For inhalation*. A small quantity of this solution may be placed in a wide-mouthed vial, and vaporized by the warmth of the hand. The vapor should be snuffed into the nose. It probably acts, as already explained, by setting free ozone. The activity of the pollen of plants, the presence of which gives rise to the symptoms of hay-asthma, is

destroyed. The offensiveness of an *ozæna* may be removed by the same expedient. *Chronic nasal catarrh* may not unfrequently be greatly benefited by the vapor of bromine. Hammond has proposed the internal use of a solution of bromine, as a substitute for the bromides in the treatment of *epilepsy*. Besides its disagreeable qualities, and its irritant action, it has no advantages over the bromides.

The most important use of bromine is as an escharotic. For the destruction of *chancre*, it is probably the best caustic. *Hospital gangrene*, the experience of the rebellion demonstrated, was more certainly arrested by bromine than by any other escharotic.

For the destruction of *carcinoma uteri*, this agent is preferred by some eminent gynecologists. When used for these purposes, pure bromine is applied, by means of a glass rod, thoroughly, to the diseased or sloughing or gangrenous surface.

The objections to the use of bromine are its fetid odor, its volatility (boils at 117° Fahr.), and the pain which attends its escharotic action.

Acidum Carbolium.—Carbolic acid. *Phénique acide*, Fr.; *Carbolsäure*, Ger. A product of the distillation of coal-tar. Is either in acicular crystals or in crystalline masses; white or colorless when perfectly pure, but, even when slightly impure, either reddish or becoming so on exposure; deliquescent and readily assuming the liquid state in the presence of a little water, yet not dissolving; of a strong odor and taste, recalling those of creosote, but distinct; fusible at from 93° to 106°, forming an oily liquid. It is soluble in from twenty to thirty-three parts of water, the purest being most soluble. Alcohol, ether, chloroform, glycerin, and the essential oils, dissolve it freely. It combines with alkalies and other salifiable bases, but its compounds have still an alkaline reaction and are decomposed by the feeblest acids, even by carbonic acid. Dose, gr. $\frac{1}{4}$ —gr. j.

Acidum Carbolicum Crudum.—Impure carbolic acid. Is either colorless or has a brown shade. It consists of carbolic and cresylic acids, in variable proportion, with impurities derived from coal-tar, which vary from ten to thirty per cent.

Glyceritum Acidi Carbolici.—Glycerite of carbolic acid (not official), (\mathfrak{z} ij carbolic acid; half a pint of glycerin).

Aqua Acidi Carbolici.—Carbolic-acid water (not official), (glycerite of carbolic acid, \mathfrak{z} x; water, one pint). Dose, a teaspoonful to a half-ounce.

Unguentum Acidi Carbolici.—Ointment of carbolic acid. (Carbolic acid, 10 parts; ointment, 90 parts.) (U. S. P.)

Creosotum.—Creosote. A product of the distillation of wood-tar. A colorless, oily, neutral liquid, having a strong, characteristic odor,

and an acrid, burning taste. Is sparingly soluble in water, but mixes in all proportions with alcohol and ether.

It is distinguished from carbolic acid, which it in some respects closely resembles, by not coagulating collodion when mixed with it, and by not imparting a blue color to a slip of pine-wood dipped first into an alkaline solution of creosote, and then, after drying, into muriatic acid.

Aqua Creosoti.—Creosote-water (creosote, 1 part; distilled water, 99 parts). Dose, a teaspoonful to an ounce.

Carbolic acid has largely superseded creosote as a remedy.

ANTAGONISTS AND INCOMPATIBLES.—Combination with alkalies diminishes, but does not entirely check, the physiological activity of carbolic acid. Saccharate of lime, or lime, is probably the most efficient antagonist from the chemical point of view (Th. Husemann). In cases of poisoning, this substance should be given freely. The mucous membrane should be protected as far as possible by the administration of vegetable demulcents, but not by oils and glycerin, which favor absorption. I am indebted to Dr. A. C. Post, of New York, in a verbal communication, for the important fact that atropine is a physiological antagonist to the systemic symptoms induced by carbolic acid. He was induced to administer atropine in a case of poisoning by carbolic acid, on observing the minutely contracted pupils and the failing circulation. The result was successful. Similar success has attended the same practice in other cases. Experiments on animals have also demonstrated the existence of this antagonism, which may now be regarded as an established fact. The rules for guidance in the administration of atropine are the same as in other cases: a sufficient quantity of the antagonist is administered to maintain dilatation of the pupil and to overcome the depression of the circulation and respiration. Elimination should also be promoted by the free use of diluents.

SYNERGISTS.—All of the phenols, the antiseptics, the motor depressants, etc., increase the effects of carbolic acid.

PHYSIOLOGICAL ACTIONS.—Applied to the integument or to the mucous membrane, carbolic acid produces a burning sensation of short duration, and there is formed a whitish, superficial eschar, which subsequently becomes brownish. The taste of carbolic acid is sweetish, cooling, and then pungent and hot. When swallowed by accident or design, the mucous membrane appears as if brushed over with a strong solution of nitrate of silver, and becomes hard and dry like leather. This appearance is observable about the lips, fauces, the œsophagus, the cardiac and pyloric extremities of the stomach, and the summits of the folds of the mucous membrane in the organ generally. This change in the condition of the membrane is due to the power of carbolic acid to coagulate the albumen of the tissues. Vom-