

tion of the acid on the heart or nervous centres, but ascribable with more likelihood to the diminished restlessness, arising from diminished thirst.

Sulphuric acid, especially in conjunction with sulphate of zinc, is considered to check the profuse sweating of phthisis and other exhausting diseases; and Dr. Graves ascribed a similar action to vinegar. The following was his favourite recipe: Distilled vinegar, ℥ij. Laurel-water, ℥ij. Syrup, ʒvj. Aqua, ℥v. An ounce or two ounces to be taken every third or fourth hour. Further, sulphuric acid appears to possess a decided power of checking bleeding from the lungs or womb. It is difficult, indeed, to understand how an ordinary dose of sulphuric acid can exercise such an influence after becoming so greatly diluted by admixture with the blood, and the difficulty is enhanced by the consideration that these acids, either before or immediately after their entrance into the blood, are converted into salts, as sulphates, nitrates, and phosphates. Whatever influence, therefore, is exerted on distant organs must be effected through these combinations; yet we cannot ascribe to any salts of these acids properties similar to those ascribed to the acids themselves.

In questions like these, experience is a safer guide than speculation. For the subtle influence of even small doses on distant organs of the body is well exemplified, by the influence of these medicines on the mother's milk; for after taking acids for some time, they induce sickness, diarrhoea, and colicky pains in the child.

Phosphoric acid has been recommended in diabetes. Griesinger, who has carefully studied the action of this medicine, considers that it does more harm than good. He pushed the acid to the extent of an ounce daily, and found that this dose increased the sugar. The members of this group augment the acidity of the urine, whence it has been proposed to dissolve phosphatic calculi by artificially acidifying the urine; but the objections to this method of treating calculi are insuperable, owing to the action of acids on the mucous membrane of the stomach and intestines precluding their persistent

administration; whilst, as the acidity of the urine can be but slightly heightened by their administration, they must be taken for a considerable time to effect any notable change in the size of a stone.

The injection of nitric acid, sufficiently diluted, has been employed with success by some eminent surgeons, and is a far more effectual treatment for phosphatic calculi. From his experiments on the solvent power of dilute solutions of this acid on calculi after their removal from the body, Dr. Roberts of Manchester considers this treatment worthy of much wider application than at present obtains: moreover, by neutralizing the urine, if alkaline, and preventing its decomposition, nitric acid injections protect the mucous membrane of the bladder from the irritation of the alkaline urine.

The further influence of sulphuric, nitric, and hydrochloric acids on the urine is unknown. Of the influence of acetic and phosphoric acids we shall speak in another place.

Before closing our remarks on the action of these acids on the body, it is right to add that phosphoric acid may possess many other properties than those specified above; but these will be referred to in speaking of the phosphates, in which form this acid exists in the blood, and manifests many of its good effects on the diseased body.

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#### SULPHUROUS ACID.

#### SULPHITES.

#### HYPOSULPHITES.

SULPHUROUS acid is commonly used as a deodorizer and disinfectant. It is a deodorizer by virtue of its power to arrest putrefaction; hence it may be used to prevent bad smells, but it possesses little or no power to decompose offensive gases; consequently it is of little service in destroying foul odours. It arrests fermentation by destroying the minute organisms which determine this process. It is ranked among disinfect-

ants, but in this respect there is at present no proof of its power. It is supposed that contagious diseases are produced by minute organized particles and that sulphurous acid will destroy them. If these conjectures are correct, sulphurous acid is a disinfectant.

It must be borne in mind that sulphurous acid corrodes metals, so that, when used as a disinfectant, these should be protected by a covering of some greasy substance. Sufficient sulphur should be burned to render the air of the room unfit for respiration, and the escape of the gas by the chimney, windows and crevices of the doors should be prevented. It is better to repeat this process three or four times at intervals of twenty-four hours. To disinfect a bed, Mr. Startin recommends that a warming-pan containing live coals sprinkled with sulphur should be put between the clothes, till the sulphur is consumed. A damp napkin held before the mouth will prevent the sulphurous acid irritating the lungs. It is far better, however, to submit the bedding, etc., which cannot be boiled, for some hours, to a temperature between 250 and 300 in a disinfecting chamber or oven.

The quickest way of curing itch is to immerse the patient in a gaseous bath of sulphurous acid, his head being left free. The bath is made by burning 12 drachms of sulphur in a suitable apparatus. Whilst in the bath, the patient's clothes should be baked, so that in half an hour he is cured of his itch and freed from risk of re-infection from his clothes.

The acid is of great use in chloasma, by destroying the parasite on which the disease depends. The acid of the pharmacopœia, mixed with an equal quantity of glycerine, may be used, (Garrod). Warm baths should also be employed to remove the cuticle infested by the parasite. It is useful also in favus, and in tinea tonsurans; but when they are unusually obstinate, its action should be assisted by epilation.

Dr. Dewar of Kircaldy, has drawn attention to the beneficial action of sulphurous acid in various diseases.

Dr. Dewar applies the sulphurous acid in three ways,—as

a solution, by fumigation, and by the spray-producer. Chilblains and chapped hands, he asserts, are speedily cured by solutions or by fumigation. Equal parts of the acid of the pharmacopœia, and of water or glycerine, he says, will at once ease the burning, and prevent the spread of erysipelas. Wounds and sore nipples he treats with the solution, constantly applied, either neat or diluted. Bruises, it is said, may be prevented or quickly removed by the same treatment.

According to the same authority, many internal diseases are equally amenable to sulphurous acid; amongst others, cold in the head, influenza, tonsillitis, malignant sore throat (scarlatinal or otherwise), laryngitis, chronic bronchitis, chronic phthisis, asthma, croup, clergyman's hoarseness, and typhoid fever.

The acid may be applied to the throat by fumigation or by inhalation: a few drops being added to boiling water, the steam is inhaled; or it may be applied by a camel-hair brush, or by the spray-producer.

It may be carried into the lungs by fumigation, inhalation, or by spray. The pharmacopœia acid, if properly and carefully employed, excites scarcely any irritation or annoyance. The application of sulphurous acid may be conducted in the following ways:

"Put a few red cinders into a kitchen shovel, set this upon a wooden stool, and then sprinkle flowers of sulphur from time to time till the room is not inconveniently filled with smoke."

The spray may be applied by a vaporizer furnished with vulcanite tubes constructed upon Dr. Dewar's plan. For a child the instrument should be held about three feet from the mouth, and the fine spray should be inhaled and repeated according to circumstances. In an acute attack with no time to lose, it may be repeated hourly, or even oftener.

In applying the spray to adults, Dr. Dewar advises "to hold the nozzle of the instrument about six inches from the patient's mouth, and administer three or four whiffs to begin

with; then, after a corresponding interval, during which a cough or two is given, the process is repeated, about twenty squeezes in all, which represents the injection of from forty to sixty minims of acid. The acid should be pure."

For the relief of rheumatism and gout, besides the fumigation, Dr. Dewar advises that the bed-clothes should be exposed to the strong fumes, and then spread over the patient. Sweating breaks out, and, after a refreshing sleep, the patient wakes much relieved.

The solution, either strong or diluted in various proportions speedily removes thrush. Dr. Lawson speaks highly of sulphurous acid as a remedy for pyrosis; indeed, he says it never fails to be of service. He finds the sulphite useless.

Sulphurous acid in doses of five to ten minims often prevents flatulence produced by fermentation, and is especially useful when the gas is abundant. It is more efficient than sulphites and hyposulphites.

Sulphites, administered by the mouth, will, it is said, prevent decomposition and putrefaction of urine in the bladder.

Sulphites and hyposulphites have been employed to destroy *sarcinæ* and *torulæ* in the stomach.

It is said that hyposulphite of soda, in fifteen to twenty grain doses every two hours, will cure intermittent fever.

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#### CHROMIC ACID.

CHROMIC acid was first used as an escharotic by Mr. John Marshall, of University College. He employed it to remove warty growths from the nose, genital organs, and elsewhere. Immediately after touching the parts with chromic acid, Mr. Marshall applies lead lotion, "which restrains the subsequent inflammation, relieves the subsequent soreness, and does not in any way neutralize or retard the rapid effects of this apparently useful escharotic." He uses a solution containing a

hundred grains of crystallized chromic acid to an ounce of water. "The solution is best applied by the aid of a pointed glass rod, or, when a large quantity is needed, by means of a small glass tube, drawn to a point. Only so much should be applied as will saturate the diseased growth, avoiding the surrounding healthy mucous membrane, for, though the solution is not sufficiently powerful as an escharotic to destroy or even vesicate the mucous membrane, it may give rise to an unnecessary amount of inflammation." Any superfluous acid may be removed by a piece of wet lint. The first effect of its application to the warts is to produce a slight smarting pain. If, however, any ulcerated surface be touched, the pain is of a burning character, more lasting, but not so acute and intolerable as that caused by nitrate of silver or by nitric acid, with or without arsenious acid. Under its influence the morbid growths rapidly waste, in some cases being thrown off altogether, and in others undergoing a partial, though evident, diminution in size. The best immediate dressing is dry lint, afterwards the part may be washed with lead lotion, and dressed with lint moistened in the same." "In most cases one application suffices, the cure being completed in from four to eight days. In severe cases, where the warts are large, repeated applications are necessary." Mr. Marshall further states that "chromic acid solution neither burns nor stains linen; it all washes out."

A solution of this acid is said to allay itching, but the kind of itching is not mentioned.