VEGETABLE ACIDS.

Acidum Aceticum.—Acetic acid. Liquid; specific gravity 1·048. Colorless, having a pungent and characteristic odor. Of this acid one hundred grains neutralize sixty grains of bicarbonate of potassium.

Acidum Aceticum Dilutum.—Diluted acetic acid. Seventeen parts of the acid to eighty-three parts of water.

Acidum Citricum.—Citric acid. In colorless crystals, freely soluble in water and soluble in alcohol. One hundred grains of citric acid neutralize one hundred and fifty grains of carbonate of potassium.

Acidum Tartaricum.—Tartaric acid. In colorless crystals, wholly or almost wholly dissipated by heat, and readily soluble in water. One hundred grains of tartaric acid saturate one hundred and thirty-three and a half grains of bicarbonate of potassium.

Antagonists and Incompatibles.—The alkalies are the chemical antagonists; yet, from the physiological point of view, the ultimate results of their action place them in the same division of remedial agents. Therapeutically, the acids are antagonized by those agents which promote constructive metamorphosis.

Synergists.—The alkalies and agents promoting waste favor the therapeutical actions of the vegetable acids.

Physiological Actions.—The vegetable acids, undiluted, have a sharp, pungent, and rather acrid taste; but, when considerably diluted, they are rather agreeable and refreshing. They have the property to diminish the sense of thirst, to abate heat and the restlessness of fever. In large quantity, they possess considerable caustic power, producing gastro-enteritis and the systemic symptoms belonging thereto. These systemic symptoms, especially the slowing of the heart, have been incorrectly, the author thinks, attributed to a special power of these agents to affect the action of the heart.

There can be no doubt that these acids obey the chemical laws of combination, and unite with alkalies to form salts, in which form they enter the blood. The most important question connected with the physiological action of these agents is, the disposition of them in the blood. The most recent and elaborate examination of this point is the "Memoir" of Friedrich Walter. This research appears to have determined that these acids do not have the power to neutralize the alkalinity of the blood, as has heretofore been supposed. That they are in part destroyed in the organism by the ozonizing action of the blood, seems undoubted. Carbonic acid is one of the products, and the presence of this, we may assume, accounts for the increased acidity of the blood and of the urine, which follows the administration of these agents.

They are eliminated by the intestinal canal, and chiefly by the kidneys. They increase secretion from the intestinal mucous membrane,

and are apt to produce tormina, flatulence, and diarrhœa. It is probable that these intestinal effects are in part due to the fact that the salts, formed by combination of the acids in the canal, escape absorption and act locally as they descend.

These acids, or the salts formed by their combination, have a decided power to promote diuresis. In this result all of the urinary constituents are included; but it is chiefly the water which is increased. To these general statements some exceptions must be made. Thus, citric and acetic acids are entirely destroyed in their passage through the organism; benzoic acid is converted into hippuric; and tartaric, citric, and malic are converted into carbonic after combination with alkali only. Furthermore, benzoic acid does not increase any of the urinary constituents.

Ultimately, wasting and emaciation, a watery condition of the blood, a scorbutic state, indeed (Bence Jones), are the results of the action of these agents.

Therapy.—Acetic acid applied to the skin has some superficial caustic property. This is made use of to cure *small warts* and *vegetations of the skin.* It is applied with a pine stick. *Parasitic affections* of the skin are similarly treated, as, for example, *pityriasis.*

Internally the acids, chiefly citric, in the form of lemonade, are used as a refreshing drink in *fevers.* They allay restlessness by relieving thirst, and they also act upon the skin and kidneys. Lime-juice is the most important *antiscorbutic,* and constitutes part of the equipment of every vessel on long voyages. It should not be forgotten that the use of lemon-juice may cause precipitation of uric acid, and thus favor the formation of calculi, as has been pointed out by Bence Jones.

Lemon-juice was at one time the fashion in the treatment of *acute rheumatism;* but more efficient remedies have taken its place.

Acids are serviceable in various disorders of the digestive tract; given before meals, they check the formation of acid, and thus relieve *acidity.* An acid and dry wine—as, for example, a Rhenish wine—may sometimes serve a useful purpose. The juice of a lemon may be taken before meals with the same object. But it is true that the mineral acids are to be preferred for this purpose. Very injurious effects are produced by the long-continued use of lemon-juice in such cases. It is sometimes taken by young ladies to keep down the formation of fat; but it accomplishes this object by impairing digestion.

Authorities referred to:

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