

minutes before a minimum fatal dose of physostigma prevents its fatal effects, in fact a quantity of atropia which produces no perceptible effects can avert many of the serious effects of a fatal dose of physostigma.

Although it is experimentally proved that atropia can avert death from physostigma, it yet remains to be proved that physostigma can prevent death from atropia.

Dr. Fraser conceives that "with regard to the counteracting actions themselves it is to be observed that various of the facts mentioned in the record of experiments (of his paper) tend to make mutual antagonism, probable not only of one, but of several of the actions of physostigma and atropia; and it is legitimate to suppose that with a given dose of physostigma, the counteraction produced by a certain amount of atropia will be more perfect in the case of one or more of the antagonistic actions, than in that of others; and that with certain doses of the two substances such incompleteness of counteraction may exist as would even without the occurrence of *non-antagonized* action suffice for the production of death."

Preyer maintains that atropia, by paralyzing the peripheral branches of the vagus nerve, will prevent the arrest of the heart's contractions by hydrocyanic acid; and is thus an antidote to prussic acid.

That atropia is separated from the body in part by the urine may be proved by putting into the eye some of this secretion voided by one to whom belladonna has been given. J. Harley states that within two hours atropia is separated from the body, as none is to be found in the urine after that time.

Dr. Garrod has shown that caustic fixed alkalies destroy the active principle of belladonna, hyoscyamus, and stramonium, but that carbonates and bicarbonates of potash and soda do not destroy it. Lime-water too is equally destructive; hence it has been recommended as an antidote in poisoning by belladonna. (J. Harley.)

### STRAMONIUM.

STRAMONIUM produces symptoms very similar to those induced by belladonna. A stramonium ointment, made by mixing half a pound of fresh stramonium leaves with two pounds of lard, and gently heating till the leaves become friable, then straining through lint, is used spread on lint and applied thrice daily at the Middlesex Hospital to relieve pain. Stramonium, smoked with or without tobacco, is mainly used to reduce spasm in asthma. It is especially useful in pure asthma, that is, when the lungs are structurally free from disease, and is useless when the dyspnoea is owing to heart disease. Twenty grains of the dried leaves, or ten of the powdered dried root, may be smoked, inhaling meanwhile into the lungs; or the fumes puffed into an inverted tumbler until it is filled may be placed over the mouth, and the contents inhaled by a deep inspiration. It excites a good deal of cough. The inhalation may be repeated again and again. It is preferable to smoke the plant unmixed, as few persons can draw the fumes of tobacco into the lungs without great discomfort. There is no doubt that stramonium is very successful in many cases of asthma; but in others, without apparent reason, it fails; and even when it succeeds, its influence, gradually diminishes by use. Sometimes *datura tatula* succeeds when *datura stramonium* has failed. Dr. Salter believed that stramonium often failed, owing to the badness of the preparation, and he advised asthmatics to grow and prepare their own stramonium. Its effect is more manifest when employed at the very commencement of an attack, affording but little relief when the paroxysm is fully developed, cold stramonium smoke can sometimes be inhaled when the hot is intolerable. It has been used in neuralgia.

Like belladonna and hyoscyamus, its active principle, as Dr. Garrod has shown, is destroyed by caustic potash and caustic soda.

**HYOSCYAMUS.**

In many respects the effects of this drug correspond to those of belladonna and stramonium. Thus it produces dryness of the mouth and throat, dilatation of the pupil, presbyopia, lightness and swimming in the head, delirium and hallucinations, a drunken gait, and often a strong desire to fight. Sometimes there is aphonia, and often sleepiness, with oppressive disagreeable dreams. A red rash has been observed after large doses. The pulse at first is much lessened in frequency, but soon recovers itself, sometimes becoming even quicker than before the medicine was taken.

Hyoscyamus is generally used to produce sleep when opium disagrees. It has also been employed in neuralgia.

Like atropia, its active principle is destroyed by the fixed caustic alkalies, as Dr. Garrod proved.

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**HYDROCYANIC ACID.  
CYANIDE OF POTASSIUM.**

THESE poisonous substances are destructive alike of animal and vegetable life.

When applied to the skin for a long time, solutions of these substances, particularly the cyanide, excite some inflammation, on account of its alkalinity.

Kept in contact with the skin for any length of time, they diminish sensibility; formerly they were employed externally in painful diseases, such as neuralgia and rheumatism; now, however, they are quite superseded by more successful remedies. But in allaying the tormenting itching of urticaria, lichen, eczema, and prurigo, they are undoubtedly very serviceable. The itching skin should be bathed with a lotion

made of a drachm of the cyanide of potassium to a pint of water, or thirty drops of hydrocyanic acid to the ounce of water or glycerine. In respect to the cyanide, the action of the prussic acid is assisted by the potash in combination with it. It need hardly be observed that such a lotion must not be applied to the broken skin, for fear of poisoning by absorption.

Dr. Gee employs sulpho-cyanide of potassium in tinea tonsurans, and recommends the hair to be kept close cut; to wash the scalp twice a day with warm water and soap, and after drying the head, to rub well into the patches a lotion composed of half an ounce of sulpho-cyanide of potassium, 1 ounce of glycerine, and 7 ounces of water, and to cover the scalp night and day with lint soaked in this lotion, superimposing a piece of oiled silk; a stronger solution is apt to excite eczema.

The acid possesses a bitter characteristic taste, and excites a sensation of itching in the mouth. It stimulates the flow of saliva, possibly by its action on the mucous membrane of the mouth.

Taken in moderate doses, the acid in a healthy stomach appears neither to produce nor to undergo change; it is nevertheless much used, frequently with benefit, in painful diseases of this organ, as in chronic ulcer, cancer, chronic gastritis, gastralgia, &c. Not only does it occasionally mitigate the pain of these affections, but it may also check vomiting.

Hydrocyanic acid passes very speedily into the blood, and is as speedily eliminated, probably with the breath; hence, if life can be supported for half an hour after a poisonous dose, the patient is generally safe.

How it destroys life is still a disputed question. Being fatal equally to plants and animals, it is not necessary that it should act on the nervous centres, as, from the rapidity of its action, has been supposed. From his experiments on frogs, Kölliker concludes that it paralyzes first the brain, next the cord, and then the motor nerves, the paralysis extending from

the trunk to the periphery. It paralyzes the heart, its action ceasing in the diastole. The voluntary muscles soon lose their irritability, and become stiff.

Preyer maintains that large doses of hydrocyanic acid paralyze the heart at once; that moderately fatal doses deprive the blood of oxygen; and that as belladonna paralyzes the peripheral branches of the vagus, and at the same time stimulates the nervous centres of respiration, atropia in these cases hypodermically injected will prevent death.

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#### OPIUM AND ITS PREPARATIONS.

SMALL doses of opium excite tetanus in frogs; on the other hand, birds, namely, ducks, chickens, and pigeons, cannot be poisoned by crude opium, the aqueous extract, nor black drop (acetum opii), given internally; and morphia salts must be given in enormous doses. Morphia employed hypodermically in very large doses never causes sleep nor stupor, but convulsions. Thebaia is a tetanising agent inferior only to strychnia and brucia. Narcotina, almost without effect on man, destroys birds in doses of two to seven grains when used hypodermically. Codeia is a fatal convulsive agent to pigeons. Meconia given internally causes emesis, but is harmless when injected under the skin. Narceia has no perceptible influence except to disturb the respiration slightly. Cryptopia in doses of one-fifth to one-half a grain has no effect. None of these agents cause sleep in pigeons, ducks, nor chickens. (Dr. Weir Mitchell.)

Dogs, cats, and rabbits, require large doses of opium to produce stupor or sleep, which is generally accompanied by convulsions. In the lower animals like frogs, it appears that opium only excites tetanus; but as we ascend in the animal

kingdom the soporific effects become apparent, and are most marked in man. Yet race modifies the effects of opium, for it drives the Javanese and Malays into a temporary madness; and even among Europeans its effects vary considerably in different individuals. In some persons, especially women, it produces much excitement but no sleep, the excitement being sometimes pleasant at other times extremely disagreeable. Whilst in some instances it fails to induce sleep, it soothes, and pleasant ideas occupy the mind; but on the other hand, with other persons it induces restlessness, excitement, and even delirium.

Preparations of opium, applied by means of poultices or friction, are absorbed by the unbroken skin.

Poultices containing laudanum are used to allay the pain of superficial and even of deep-seated inflammations, and enough may be absorbed in this way to produce deep sleep. Friction increases the absorption considerably; thus liniment of opium, well rubbed in, relieves neuralgias, pleurodynia, and myalgia. The abraded skin absorbs still more freely, and preparations of opium or morphia are applied to irritable, cancerous, and simple sores. Morphia dissolved in glycerine and spread on lint, is a useful application to a painful cancerous sore.

The hypodermic injection of morphia, originated by Dr. Alexander Wood, is now extensively employed to relieve pain, produce sleep, prevent spasm, and for other purposes, and is preferable to the administration of the drug by the mouth. Its action is more rapid; its effects are more permanent; and it neither destroys the appetite nor constipates the bowels. Dr. Anstie maintains that "anodynes and hypnotics ought never to be administered by the mouth in acute diseases attended by anorexia." At first not more than a sixth part of a grain should be injected; a larger quantity sometimes produces serious symptoms.

An injection not unfrequently causes a good deal of excitement, giddiness, even intoxication, great nausea, and repeated vomiting, followed by considerable depression. Often,