

BROMIDE OF POTASSIUM.  
 " SODIUM.  
 " AMMONIUM.  
 " LITHIUM.

In physical and chemical properties these salts are closely allied to the corresponding iodides; yet in their action on the body, the bromides and iodides exhibit considerable differences.

When administered for some time, bromides occasionally produce an acneform rash and even boils; effects to be more fully described in a subsequent part of this section. Dr. Cholmeley reports some obstinate cases of acne cured by moderate doses of bromide of potassium.

As a local application to ease pain, or remove spasm, bromide of potassium, in five parts of glycerine, has proved useful it is said, in hæmorrhoids, fissures of the rectum, and in painful growths.

When bromide of potassium is taken in moderate doses for some time, or when large quantities are administered for a shorter time, it induces loss of sensibility in the soft palate, uvula, and upper part of the pharynx, evidenced by the absence of movement in these parts when they are touched. Zoëffel finds that bromide of potassium affects the reflex irritability but not the sensibility of the pharynx; thus, after its use, irritation of the throat will not excite deglutition, but the pain of operations is not lessened. He agrees with Voisin, that thirty grains may be insufficient to affect the pharynx, and that sometimes it may be necessary to repeat this dose two or three times a few hours apart. On account of this property the bromides are recommended to remove or lessen the excitability of the throat, preparatory to a laryngoscopic examination. It is even averred by some writers that merely brushing the pharynx and soft palate with a solution of the bromide, is sufficient to quell the irritability, so as to enable a laryngoscopic

examination to be made with ease. Many observers, however, doubt the efficacy of bromide for this purpose. Dr. Mackenzie considers that ice is the only means of lowering the excitability of the pharynx.

Assuming that the bromides possess the property of diminishing the sensibility of the pharynx, it has been surmised that they may exert a similar influence on the larynx, lessening its excitability, and may thus prove useful in those diseases accompanied by spasmodic contraction of the glottis, as whooping cough and laryngismus stridulus.

The discrepant statement concerning the influence of this remedy on these diseases can be reconciled in the following way:—

As to whooping cough, all observers must admit that some cases are altogether uninfluenced by this remedy; that it neither lessens the frequency nor the severity of the paroxysms of coughing. In other cases it appears, however, to control both the frequency and severity.

The bromide, the author believes, will be found serviceable only in simple uncomplicated whooping cough. If there is fever, or much catarrh of the lungs; if there is pneumonia, or tuberculosis; if the child is teething, and the gums are swollen, red, and painful; or if any gastric irritation exists, then this remedy fails till these affections have been met by appropriate treatment. These complications being removed, and the case reduced to a simple form, the bromide of potassium does certainly influence the disease, lessening both the frequency and severity of the paroxysms.

It is thus found to be of most service in the summer, or when the weather is genial and mild. Like other remedies for whooping cough, the bromides are more efficacious in some epidemics than in others.

The efficacy of bromide of potassium on laryngismus stridulus, is subject to conditions very similar to those which limit its usefulness in whooping cough. Any irritation, as from teething, must be removed before the remedy appears to manifest any power.

As, however, we possess in cold sponging, a cure for laryngismus stridulus, ready, prompt, and efficient, we need not often have recourse to the bromide. (See Cold Bath, p. 19).

The bromides are sometimes useful in whooping cough and laryngismus stridulus when complicated with convulsions. During a paroxysm of laryngismus stridulus or whooping cough, the obstruction in the larynx becomes not unfrequently so great as to produce very imperfect oxidation of the blood, and to cause partial asphyxia, resulting in an attack of convulsions. Convulsions, moreover, are not uncommon in laryngismus independent of asphyxia, unaccompanied with an attack of crowing. The early and less developed stage of these convulsive attacks being manifested in carpo-pedal contractions, squinting, &c. The recurrence of these convulsions can be controlled by the bromides, even when the disease is apparently otherwise uninfluenced.

With regard to laryngismus stridulus, cold sponging is generally sufficient to avert the convulsions; but in those cases where, from the effects of any irritation, cold sponging is ineffectual, the bromide of potassium, will, in most instances, avert the convulsions, obviating thus, one of the gravest dangers of this disease.

It occasionally happens, from the time of their birth, that children can swallow solids with ease, yet are choked every time they try to drink. This affection is in no way connected with diphtheria or any visible affection, or malformation of the throat. This curious affection may be much benefited by the bromide of potassium.

The bromides, so far as is at present known, appear to have very little influence on the stomach.

In certain diseases, these salts exert a beneficial influence on the intestines; for instance, in a form of colic, which sometimes affects children a few months to one or two years old. The walls of the belly are retracted and hard, while the intestines are visibly, at one spot, contracted into a hard lump, the size of a small orange, and this contraction can be

traced through the walls of the belly, travelling from one part of the intestines to another. These colicky attacks occur very often, and produce excruciating pain. This form of colic is unconnected with constipation, diarrhoea, or flatulence. Sometimes it is associated with a chronic aphthous condition of the mouth. It generally resists all other kinds of treatment, but will mostly yield at once to the bromides.

Like the iodides, these salts pass quickly into the blood, and we shall now treat of their influence on the organs to which they are conveyed by this fluid.

The experiments of Brown-Sequard, Meuriot, and Amory, show that bromides contract all the blood vessels, producing anæmia of the brain and spinal cord, thus diminishing the excitability of these organs. Certain experiments show that this contraction is probably owing to the action of bromide of potassium on the vaso motor nervous system. The six toes of both hind feet of a frog were quickly cut off, and during the following two minutes eight drops of blood flowed from the right leg and nine from the left. Another frog, after being poisoned by bromide of potassium was treated in the same way, but during the two minutes after amputation two drops only flowed from the right leg. The left sciatic plexus was then divided, thereby cutting off nervous communication between the limb and the vaso motor centres, and in two minutes ten drops flowed from the left leg.

Under the influence of bromide of potassium decided diminution of reflex irritability is observed in animals. M. Laborde applied bromide of potassium to the web of a frog's foot, and twenty minutes after its absorption reflex irritability ceased,—first in the posterior extremities. This diminution of reflex irritability is not due to the action of bromides on the muscular tissue, as the muscles contracted energetically on the direct application of electricity. Nor is it due to the action of the drug on the motor nerves, for after poisoning a frog and tying a ligature tightly round a nerve, electricity applied beyond the ligature excites muscular action, but when applied to the proximal side of the ligature, it induced no

reflex action. Dr. Amory thinks that the diminution of reflex irritability is due in part to alteration of the sensory nerves, but mainly to diminished supply of blood to the cord.

Bromide of potassium is used in a variety of diseases, but its virtues are chiefly conspicuous in convulsions.

It is serviceable in all forms of convulsions—in epilepsy, in the convulsions of Bright's disease, and in the convulsions of children, whether due to centric or eccentric causes. Although convulsions may be excited by many causes, it is probable that the conditions of the nervous centres producing the attack are in every instance identical; and it appears to be these conditions which the bromide controls.

In no disease is the bromide of potassium more efficacious than in epilepsy. But the bromide is not equally useful in all its forms, for this drug leaves attacks of *petit mal* often unbenefited. It is the convulsive form of epilepsy which is so remarkably amenable to the bromide, for in by far the greater number of cases, the fits, under its influence, become much less severe and less frequent. Even when of great severity, and repeated perhaps several times a day, the fits may be postponed for weeks, and even months; nay, in some cases, the fit has been delayed for years.

Cases of the convulsive form, however, occasionally occur, over which the bromide appears to exert no influence; the fits recurring as often and as severely as if no medicine had been taken. At present it is not possible to foretell when the medicine will succeed, and when it will fail. As might be expected, the effects of the drug are most marked when the disease is of short standing.

Dr. Weir Mitchell recommends bromide of lithium in epilepsy. It contains a larger percentage of bromine than either the sodium or potassium salts, and it acts more powerfully, so that smaller doses may be given. Dr. Mitchell thinks the lithium salt succeeds sometimes when the potassium and sodium salts fail. As a hypnotic, he says, "it is superior to the potassium and other salts of bromine." Echeverria thinks it is inferior to the potassium salt in epilepsy, and superior as a hypnotic to the sodium and calcium salts.

Echeverria considers the potassium salt in epilepsy much superior to the ammonium salt. The ammonium salt is more disagreeable to the taste. In epileptic maniacal excitement Echeverria finds bromide of sodium far less serviceable than bromide of ammonium. He moreover asserts that bromides fail to suppress mental excitement in epileptics unless combined with some other narcotic, as conium, cannabis indica, hyoscyamus, chloral (15 to 20 grains each) or still better, ergot of rye.

Brown-Sequard thinks it advantageous to mix the potassium and the ammonium salts, this combination exerting a greater influence on epilepsy than either salt separately, and lessening the risk of bromism. Echeverria disputes these assertions.

In mild epileptic cases, ten grains three times daily is sufficient. If the attack occurs only at night the best way to avert it is to give, at bed-time, a full dose of thirty grains. Echeverria finds that the average dose required is sixty grains daily, but in severe cases a much larger quantity may be needed. In respect to the dose, Voisin says, "I have employed for many years a method which has given me the best results, and which consists in determining the condition of reflex nausea by introducing a spoon as far as the epiglottis. I have remarked that a therapeutic dose of the bromide of potassium is not attained till reflex nausea is suppressed; it is not till then that the bulb is certainly acted on, and its excite motory force diminished. . . . The study of other reflex phenomena, such as lachrymation, cough and sneezing, enables us to follow the action of the medicine upon the bulb and spinal cord. The dose should not be increased beyond the suppression of reflex nausea, but it should be given continuously for years together. If the malady be ameliorated or in process of cure, at the end of two years of amelioration, the remedy instead of being administered every day may be given every second, third or fourth day, provided reflex nausea be always and certainly absent." Voisin considers that the early manifestation of toxic effects is a good, and their late appearance a bad, augury.

If the patient is not cured, but only benefited, by the bromide, it may be continued for months or years. But its administration should be suspended at times for a week or ten days, otherwise the system becomes accustomed to it, when it loses its influence over the disease, so that not uncommonly the good effects so well marked originally, cease altogether, the fits recurring with their old severity and frequency. If the drug is withheld for a time in such a case, and then resumed, it again manifests all its previous efficacy.

It has been asserted that chloride of potassium in epilepsy is as efficacious as bromide of potassium; this statement, however, has been denied.

We have already spoken of the effect of bromide of potassium on the convulsions sometimes accompanying whooping-cough and laryngismus stridulus. The bromide will often succeed in all other diseases associated with general convulsions. Of course the exciting cause of the convulsive attacks should, if possible, be removed; but even when the cause is indetectible, this salt will often lessen or prevent the epileptiform attacks. The convulsions caused by intestinal worms sometimes resist this remedy completely.

Bromide of potassium will often check the convulsions resulting from simple meningitis, which sometimes persist after the decline of the inflammation, leaving serious damage behind.

Many writers extol bromide of potassium in teething, averring that it obviates irritability and restlessness, and prevents convulsions.

Dr. Begbie has much commended this salt as a soporific. The hypnotic effects, Dr. Clarke and many others consider due to the anæmia of the brain which these salts produce. Too much anæmia he asserts, induces wakefulness, whilst a less degree produces sleep. In this way he explains the different effects of bromide of potassium on himself. After unusual mental or physical fatigue which he asserts causes anæmia of the brain, forty or fifty grains of bromide of potassium by increasing the anæmia caused sleeplessness, but it

soothed and quieted him. When only wakeful from an ordinary amount of mental work, a state when the brain is in a hyperæmic condition, the same dose produced sound and refreshing sleep. Given when the brain receives only a usual amount of blood it produces unusually profound sleep. Voisin referring to his patients in the Bicetre says, "the hypnotic action upon them was very remarkable night and day. Some were obliged to sleep for a few minutes at a time in the midst of their work. None, in spite of whatever efforts they made to the contrary, could resist sleep directly after their evening meal." It has been found of especial use in obviating that sleeplessness and wandering at night, not unfrequently occurring during convalescence from acute diseases. Often, too, it is of service for the like symptoms during even the febrile stage of inflammatory and specific fevers, as pneumonia, rheumatism, and typhoid fever.

In sleeplessness from other causes, as worry, overwork, grief, dyspepsia, etc., it may be employed with the expectation of success. Besides sleeplessness, if the patient, although of abstemious habits, suffers from delirium, having the characters of delirium tremens, these remedies are especially indicated.

Bromide of potassium is often of conspicuous benefit in delirium tremens, removing the delusions, calming the delirium, and inducing sleep; and its efficacy is most apparent in the earlier stages, before the delirium becomes furious. It is, moreover, of great service in dispelling delusions which may remain after the partial subdual of the attack.

Dr. Clarke recommends salt in the insomnia accompanying mental anxiety, hysteria, pregnancy, and "a sort of hyperæsthesia, which I know not how to describe by any other name than general nervous irritability."

To produce sleep, twenty to thirty grains should be given at night; and should this prove insufficient, a like dose may be taken in the morning. Likewise twenty to thirty grains, or even more, may be given in delirium tremens every two hours, till the patient falls asleep. The salt often succeeds as

a soporific when opium fails. It increases the hypnotic effect of chloral, hyoscyamus, belladonna, cannabis indica, ether and chloroform.

Dr. Begbie recommends it for persons who have overtaxed their brain by study, or an over-strenuous application to business. It calms the excitement, procures sleep, and dispels the giddiness, noises in the ears, and perversions of the external senses, which often harass these patients. In such cases it is invaluable. He also recommends this salt in acute mania. It is useful too in the headache connected with grief or worry. Drs. Yandell and Davis of America, and Latham of Cambridge, have administered the bromides successfully in sick-headache, occurring in both men and women. It is serviceable where the headache precedes and predominates over the gastric symptoms; also when the patient is troubled with sleeplessness or dreamy unrefreshing sleep. Drs. Yandell and Davis find five or six grains generally sufficient, but they have given half a drachm three times a day. It is stated that an attack may be considerably shortened by taking a narcotic dose at the onset of the attack; the patient falls asleep and wakes free from headache. Dr. Wilks narrates the case of a gentleman, who, after a hard day's work would return home with a splitting headache, when on taking fifteen or twenty grains of the salt, he would fall asleep and in an hour wake free from pain.

Sometimes in the later months of pregnancy, a woman becomes at night the prey of the most frightful imaginings, labouring under the impression that she has committed, or is about to commit, some great crime or cruelty, as the murder of her children or husband. The bromide dispels these delusions, and induces calm, refreshing sleep.

Dr. Clarke commends bromide of potassium in many of the distressing troubles incidental to "change of life," as timidity, irritability, broken sleep, apprehension of serious evil, flushings, numbness, and deranged sensations.

Bromide of potassium is of great service in the treatment of children subject to night screaming, a symptom which appears

to be allied to nightmare. Children from a few months to several years old may be attacked with this affection. Sometimes the attack occurs only once or twice a week, as is usually the case with older children; or it may be repeated several times each night. The screaming may last only a few seconds, or it may endure for several hours. While screaming, these children are generally quite unconscious of what is occurring around them, and cannot recognise, nor be comforted by, their friends. They are generally horribly frightened. A somewhat similar condition is met with in children a few years old, a state very similar to somnambulism, but sometimes apparently allied to epilepsy. The child gets out of bed while fast asleep, walks about the house, and performs as if awake, various acts, quite unconsciously. This state is not accompanied with any terror. With the screaming and fright, squinting sometimes occurs, which, after some time may become permanent. Bromide of potassium will prevent the screaming, and remove the squinting. This affection in children being connected very generally with deranged digestion, the condition of the stomach or intestines should be attended to; but even in spite of this derangement the bromide will give quiet and refreshing sleep.

The nightmare of adults will generally yield to the same medicine.

Men, but especially women, and usually townspeople, become subject to great despondency, at times so unendurable as to make them, as they express it, "feel as if they should go out of their mind." These distressing symptoms generally yield to bromide of potassium. It is soothing in hysteria, giving patients greater control over themselves and preventing hysterical paroxysms.

Dr. Begbie has used the same salt with great advantage in some cases of asthma and of diabetes. It occasionally relieves the pain of neuralgia.

It is also used with decided benefit in certain derangements of the organs of generation. Large doses are said to lessen the natural menstrual discharge. In some forms of menor-

rhagia it is equal, if not superior, to any remedy we possess; but it is more useful in the flooding of young than of old women. Over that form of flooding due to uterine tumours of various kinds it exerts less control than ergot and some other remedies. To check profuse menstruation, its administration must be regulated by the circumstances of the case. If the loss of blood occur only at the natural period, the medicine is then commenced about a week before: and when the menstrual flux has ceased, the remedy should be discontinued till the next attack is about to begin. On the other hand, if the loss of blood occurs every two or three weeks, or oftener, the medicine must be given without intermission till the loss is controlled; and when the discharge has been brought to its right period and amount, it will still be desirable to give a few doses for a short time before each monthly period. Ten grains three times a day is a dose sufficient in the flooding of young women but much larger doses are required in the more obstinate forms depending on organic changes in the womb. This remedy has been recommended by Dr. Begbie in puerperal mania and nymphomania. Dr. Clarke also says it reduces sexual excitement in those instances of hysteroidal excitement verging on nymphomania. Small doses are unavailing. Not less than twenty grains thrice daily will exert a decided control over excessive sexual propensity.

It also restrains spermatorrhœa. Its employment should be supplemented by cold sponging of the scrotum and perinæum, and the suspension of the testicles in cold water for some minutes, night and morning. Seminal emissions are generally excited by dreams, which may generally be avoided by abstaining from suppers and sleeping on a hard mattress. Dr. George Bird has pointed out that seminal emissions occur from undue indulgence in bed, the emissions taking place very generally early in the morning, during the second sleep. He recommends, therefore, that the patient should be roused after six or seven hour's sleep, and should never give in to a second sleep. Dr. Hardman of Blackpool tells me that he has cured some obstinate cases of spermatorrhœa, by direct-

ing the patient to empty his bladder on waking from the first deep sleep.

It proves useful in allaying various forms of hyperæsthesia, and sometimes eases the severe pain of chronic arthritis.

Dr. Da Costa finds that bromide of potassium lessens or even prevents many of the disagreeable symptoms of opium, as giddiness, confusion of mind, fainting, headache, and sickness. It manifests this effect over morphia and codia less than over laudanum. A large dose—20 grains—of bromide must be given half an hour before and two hours after the laudanum. Even larger doses are sometimes necessary; he even gives 40 to 60 grains some hours before the administration of the opium. Da Costa says the bromide exerts most control over the faintness. He avers also that the bromide heightens the "anodyne or hypnotic effects of opium."

If the medicine is continued for a long time, as is sometimes required in the treatment of epilepsy, the physiological effects of the drug become apparent. "Diminished sensibility, followed by complete anæsthesia of the soft palate, uvula, and upper part of the pharynx, is the first symptom that the patient is getting under the influence of the drug. The sexual organs are amongst the first to be influenced, for there is soon produced failure of sexual vigour, and after a time marked diminution of the sexual appetite itself" (Bazire).

These effects vary greatly; in some the remedy producing only moderate diminution, in others temporary impairment. On discontinuing the remedy the sexual organs regain their lost power. Another frequent result of the prolonged administration of the bromide, is an eruption, generally acneform, occurring most on the face and back, but it may affect even a larger surface. These spots do not generally suppurate, nor do they scar. Echeverria asserts that five or ten minims of liquor arsenicalis, given with the bromide, will prevent this eruption. I have found that iodide of sulphur ointment, frequently applied, considerably lessens the quantity and the severity of these eruptions. The efficacy of the remedy bears no proportion to the amount of acne. The bromide sometimes

excites, it is said, eczema and spots like erythema nodosum. The acneform spots may become true boils, and these boils sometimes form large ulcers with conical scabs, looking like rupia. Dr. Weir Mitchell narrates a case of this kind. He found that bromides of potassium, sodium, ammonium, and lithium, produced these ulcers. He tried also bromides of calcium, magnesium, and bromine itself, but as these preparations failed to control the epileptic fits they were not given long enough to determine if they too would produce these rupoid ulcers. Undue administration of the bromide renders a patient low-spirited, easily fatigued and unfitted for work, symptoms which soon subside on the suspension of the medicine.

Acne, and the other evidences of bromism, rarely occur, unless more than one dose, however large, is taken daily.

M. Rabuteau says that bromide of potassium may be detected in the urine and saliva twenty days after the administration of a dose of fifteen grains. Dr. Amory could not detect it more than forty-eight or fifty-two hours after a single dose, but for a much longer time after the drug had been taken several days. Elimination by the urine is less rapid than absorption by the stomach. Traces appear in the urine in ten minutes. Elimination is most active during the first eight or ten hours, and in less than twenty-four hours the greater part disappears.

Bromide of potassium is conveniently administered in beer or milk.

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#### SULPHURIC, HYDROCHLORIC, NITRIC, PHOSPHORIC, AND ACETIC ACID.

The members of this group are powerful acids, and accordingly have a strong affinity for alkalies and bases. Some of them, as sulphuric and phosphoric acids, absorb water with avidity. They all possess a high diffusion-power, and so pass

readily through animal membranes and textures. These are the properties which explain most of their actions on the living body.

These acids, when concentrated, produce decided changes in the skin by their affinity for the bases and water of the tissues, as well as in a minor degree for the organic substances themselves. Their great diffusion-power enables them to penetrate readily and deeply beneath the surface, and to continue their destructive action till they are diluted with water or neutralised by the bases of the animal structures. From their greater affinity for water, sulphuric and phosphoric acids are especially energetic: they withdraw this element from the textures, and thus effect their complete destruction. Applied in adequate quantity, they will destroy the tissues to a considerable depth, and produce a brown or black eschar.

The remaining members of this group, owing to their feebler affinity for water, destroy the tissues less extensively, and their action is much more superficial.

Sulphuric and phosphoric acids are never used undiluted, on account of their physical action on the tissues. Nitric acid, on the other hand, is frequently employed to destroy and remove the surface of foul and unhealthy sloughs and ulcers; and, in virtue of a property of which we shall shortly speak, to change an unhealthy and indolent sore for one more healthy and prone to heal. Thus it is frequently employed in cases of soft chancres, indolent and broken bubo, cancrum labialis, etc.

Nitric, hydrochloric, and especially acetic acid, may produce some vesication. Nitric acid colours the skin characteristically yellow.

They are often used for the purpose of exciting inflammation, and often with the best results. It is now established that two diseased actions cannot co-exist actively in the same part. On this principle, we use one or other of the three acids, nitric, hydrochloric, and acetic. For instance to a patch of herpes circinnatus, we apply an acid, usually acetic,