THE
BOSTON MEDICAL AND SURGICAL JOURNAL.

NEW SERIES.]

THURSDAY, OCTOBER 7, 1869.

[VOL. IV.—Nos. 10 & 11.

Original Communications.

THE INTERNAL USE OF CARBOLIC ACID.

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SINCE the first introduction of carbolic acid to the notice of the profession, as a remedial agent, in the early part of the present decade, many pages, I might, perhaps, say volumes, have been written, pro and con, upon the question of its therapeutic merits. And although in some respects its good qualities are pretty thoroughly established, in others it must still be considered as *sub judice*—a statement, forsooth, that might be truthfully made concerning every article of the materia medica, so uncertain is the greater part of our so-called knowledge, in regard to the action of drugs upon the human system, in health and disease.

The power possessed by carbolic acid, in common with several other allied compounds extracted from coal tar, of arresting the processes of putrefaction and fermentation, and of destroying the germs of organic life, or of preventing their development, is generally considered the chief basis of its therapeutic value; and it was the discovery of this power that prepared the way for its employment externally as a disinfectant, deodorant and preservative. The manifest success of its application for these purposes, led, very naturally, at a time when the minds of medical men were possessed by the notion of the zymotic or fungous origin of certain diseases, to its use internally. Who first thought favorably enough of the idea to put it into actual practice, it would be difficult now to ascertain. Probably the credit of originality is due equally to more than one observer. The editor of Braithwaite seems to ascribe it to Dr. Keith, of Normandy, England,* but in this he is widely mistaken, as will appear by the citations further on.

When administered internally, whether by the stomach, in the form of spray by inhalation, or as an injection to be retained,

the remedy is always applied to a mucous surface, and from it absorbed into the blood. Hence there are three classes of effects to be studied. 1, The local effects upon the mucous membrane. 2, Effects upon the substances in contact with the mucous membrane. 3, Effects upon the blood and vital processes after absorption.

The local effects, when employed in very dilute solution, as, of course, it always is in the methods of administration mentioned above, are those of moderate and agreeable stimulation. It has been called a local sedative; and it certainly does allay nervous irritation, itching, &c. This may, however, be mostly a secondary effect of its chemical, or of its stimulant action.

Its effect upon the substances in contact with the membrane, whether mucus, pus, blood, the digestive fluids, aliment, fæces or other matter, are chiefly in the direction of arresting or preventing destructive chemical changes. In this way it prevents the formation of new substances which irritate the mucous membrane, and cause distress, or aggravate any existing derangement of function or condition. Its powers as a local alterative are, I opine, due mainly to this action.

It has been suggested that it might retard the process of digestion, when taken into the stomach with the food, by interfering with the action of the nitrogenized constituents of the digestive fluids. I have tested its influence upon the salivary and gastric fluids with respect to their peculiar action upon the food, in the manner described below.

Experiment I.—The fluids of the mouth were tested for sugar, and found to contain none, or only the merest trace. A piece of boiled starch, free from sugar, was held in the mouth for five minutes, filtered, and tested for sugar. A beautiful and decided reaction, showing its presence in large quantity.

Experiment II.—A portion of starch was intimately incorporated with an aqueous solution of carbolic acid, and held in the mouth for five minutes. Test, and result as in Exp. I.

* Braithwaite's Retrospect, July, 1869, p. 26.
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Experiment III.—A piece of starch intimately mingled with a larger quantity of carbolic acid, as much as could be comfortably borne by the mouth, was subjected to the same process with the same result as in the other two experiments.

These experiments were repeated, with the variation of holding the starch in the mouth a much shorter period, from one half minute to a minute, with exactly the same result, except that the test showed less sugar to be present in each instance.

Experiment IV.—An artificial gastric juice was made by macerating the stomach of a recently-killed cat, in an ounce of water, acidulated with thirty minims of hydrochloric acid. This was filtered, and a clear, slightly yellow liquid obtained. Seven test-tubes of the ordinary size were then tightly fitted with corks, and into each one was put forty minims of the "gastric juice," and a small shred of beef. The shreds of beef were all, as nearly as could be judged by the eye, of equal size. To test tubes *a* and *b* no further additions were made. To *c* was added $\frac{1}{4}$ minim of carbolic acid dissolved in water. To *d* was added $\frac{1}{2}$ minim of carbolic acid dissolved in water. To *e* was added $\frac{3}{4}$ minim of carbolic acid dissolved in water. To *f* was added one small drop of carbolic acid, taken up by a glass rod. To *g* were added two such drops. The whole were then placed at a temperature of 96° ad 100° F., agitated occasionally, and the result noted at the end of six hours, as follows:—

Test tubes *a* and *b*, meat completely digested; fine, red sediment at the bottom of the tubes; liquid above somewhat whey-like.

Test tube *c*, meat completely disintegrated; a few minute muscular fibres floating about undisturbed.

Test tube *d*, meat partially digested; solid fragments still undissolved.

Test tube *e*, meat digested to a less degree than that in *d*.

Test tube *f*, meat only slightly acted upon, shred remaining entire.

Test tube *g*, same as in *f*.

After the lapse of ten hours the meat in *d* was found completely digested. In eighteen hours that in *e* was nearly digested. In the others there was no further change apparent.

From these experiments, granting that the solution used in the last was a fair equivalent for the gastric juice, and that there has been no error of observation, we may, I think, deduce the following conclusions:—

1. Carbolic acid does not prevent, and

probably does not retard, the conversion of starch into sugar by the salivary fluids.

2. When present in no greater proportion than one part in one thousand, carbolic acid does not interfere seriously with the solvent action of the gastric juice upon the nitrogenized constituents of food.

3. When present in larger proportion it interferes with this solvent action, according to its amount. The interference is decided when one part in three hundred and twenty is present; and the one hundred and twentieth part entirely prevents digestion.

From these deductions we may assume that, given in the ordinary doses of the acid, no impairment of primary digestion need be apprehended. When given in doses sufficiently large to retard digestion, the constitutional, poisonous effects will be developed, and overshadow the others. Still it is reasonable to suppose that given with the food for a long time, even in small quantities, it might have an unfavorable effect upon the economy, owing to the power which the experiments prove it to possess.

With reference to its effects upon the blood and vital processes after absorption, a grave question arises. Has it any injurious control over ultimate nutrition—over those processes of waste and repair which are constantly going on in the organism, and the due balance of which is essential to health? This question cannot be answered. It unfortunately belongs to that dark domain of ignorance and conjecture, vital chemistry. We can, however, safely assume that there is a *probability* of its possessing such control; and this probability, together with the conclusions arrived at from the experiments, seem to indicate, very clearly, a limit to the therapeutic usefulness of carbolic acid, when administered internally. But within this limit there is a large class of morbid conditions which, we should naturally conclude, would be favorably affected by its use. And there is not wanting abundant testimony (however valuable or valueless it may be considered) to its efficacy. I make a few references in order to show the direction in which the testimony tends.

Dr. Godfrey, of England, advises its use internally for gastric irritability, the vomiting of pregnancy, flatulence from imperfect digestion, and certain forms of diarrhoea.*

Dr. Kempton, of Utica, N. Y., has found it of advantage in a somewhat similar class of affections, such as sluggishness of the bowels with offensive breath, dyspepsia

* Medical Circular, Dec. 17th, 1862.

with eructations of gas, a yeasty condition of the stomach, diarrhoea from eating unripe fruit, &c. The doses in which he gave it were one or two drachms of a solution of one grain to an ounce of water, *pro re nata*. He also employed the remedy with success by inhalation for nasal catarrh with profuse, offensive discharges, and by gargle for sore throat in scarlet fever, diphtheria, and simple tonsillitis.*

Dr. Wolfe, of Aberdeen, believes it beneficial in all stages of phthisis, particularly for arresting hæmoptysis, allaying irritation, and arresting the profuse secretion in cases of chronic bronchitis and of cavities in the lungs, of laryngeal-phthisis and of colligative sweats.†

Mr. Blake, of Birmingham, deems it of very great use in whooping cough, given by inhalation.‡

Dr. Andrew Clark, at the London Hospital, considers it valuable in the treatment of vomiting associated with fermentation and catarrh, given in one grain doses in pill; in hæmatemesis from gastric erosions, or ulcer, one grain dissolved in water, with a little spirit every two or three hours; in atonic cases of chronic gastric catarrh, where bismuth, silver, and the acids have failed, in quarter grain doses, much diluted, upon an empty stomach, to be preceded by two or three days' employment of bicarbonate of soda, with or without hydrocyanic acid; in water brash, grain doses with opium and bismuth; in flatulence, for temporary relief, in grain doses, in pill; in chronic bronchitis, and bronchorrhœa, taken by the stomach in half grain doses dissolved in water, several times a day, and by inhalation of vapor produced by the addition of twenty drops of deliquesced acid to a pint of boiling water, or in the form of spray by the atomizer, one grain to six ounces of water; in certain forms of phthisis in which there is much secretion from bronchial tubes or cavities, and not much irritation, vapor from boiling water (spray cannot be used with safety in any case of phthisis); in oozing hæmorrhages from air passages, in diarrhoea accompanying the march of epidemic cholera, in mucous disease of the large intestine, given by inhalation.

Dr. Clark thinks the remedy of no use in cholera, and so far as his experience goes, of little value in fevers.§ It will be observed that his testimony in regard to its

efficacy in phthisis is directly in opposition to that of Dr. Wolfe, on some points.

Dr. Fuller, of London, employs it in six or eight minim doses of the deliquesced acid for dyspeptic cases of the fermentative class; in scarlatina with sloughing throat; and in the form of spray in the early and advanced stages of phthisis, in laryngeal phthisis, chronic bronchitis, gangrene of the lung, and various affections of the throat. Solution five to ten minims to ounce of water.* He does not find that it exerts any controlling influence over typhoid and gastric (?) fevers.

Dr. Garraway places great reliance upon it in the vomiting of pregnancy. He gives drop doses three times a day.†

Dr. Keith recommends it internally for scarlet fever, smallpox and measles. The therapeutical effects which he attributes to it are profuse perspiration; rapid lowering of pulse; reduction of fever; improvement of tongue and throat; increase of appetite, all after its use for twenty-four hours. He thinks it most useful in the early stages, but given afterwards it very much modifies the symptoms and carries the patient through the different stages more rapidly than any other treatment he has seen. He noticed that in some cases the urine appeared smoky, as if fine charcoal had been used with it.‡ He prescribed the remedy in combination with acetic acid, laudanum, and chloric ether. For this reason it is difficult to know how much weight to give to his conclusions. A rigid criticism would certainly reject them altogether.

It is manifestly unreasonable to combine several articles of the *materia medica*, some of them of known potency, and some of them of unknown, and ascribe all the supposed effects to the unknown. To ascribe them to the medicine at all, may involve the fallacy of *quia post ergo propter*, but the course indicated above, too often, indeed, followed, tends to introduce a new and more alarming element of uncertainty into the conclusions. We have too much of imperfect observation and false reasoning in therapeutics. Our periodicals are filled with statements of the efficacy of this or that drug in the treatment of this or that disease, and yet, as a rule, we distrust them all, for we have learned from experience how unreliable they are. The lines of scientific criticism have not yet been drawn closely enough in this department of medical research.

* American Journal of the Medical Sciences, July, 1868.

† Med. Times and Gazette, Nov. 25, 1865. Braithwaite, Part liii. p. 87.

‡ Med. Times and Gazette, April 11, 1868.

§ British Med. Journal, Feb. 13, 1869.

* British Med. Journal, Feb. 20, 1869.

† British Med. Journal, March 13, 1869.

‡ London Lancet, Jan. 23, 1869. Braithwaite, Part lix, p. 26.

It will have been observed that the doses in which carbolic acid has been given by different experimenters, varies from one-eighth grain of the crystals up to eight minims of the deliquesced acid, in pill or solution, by the stomach, and from one grain to ten minims to an ounce of water for inhalation. My own dose ranges from one minim to three, three times a day, or oftener if required, by the stomach, and from one minim to five to the ounce of water for inhalation. I prefer to give it always in largely diluted aqueous solution. The taste can be to some extent masked by a little lemon juice or cinnamon water. Dr. Fuller, who uses the largest doses of any one who has written upon the subject, has noticed faintness follow occasionally the long-continued application of the spray.* I have several times noticed dizziness and faintness following the use of three minim doses taken into the stomach, in dilute solution. I consider that three minims should be the maximum dose. We ought not to lose sight of the fact that carbolic acid, like other potent medicines, is a dangerous poison; that it has proved fatal in more than one instance when applied as a wash to the whole surface of the body in some skin diseases; and several times when taken internally.

It would be difficult to state the smallest amount that could prove fatal to an adult. I should tremble for the safety of a patient who had taken half a drachm, or even twenty minims, in however weak solution.

The following cases will illustrate my manner of employing the remedy, and show, to some extent, its beneficial effects, as well as the negative results of its administration.

CASE I.—Mrs. O., a sufferer from chronic Bright's disease, and its usual concomitants, amaurosis, cephalalgia, slight general anasarca, irritable stomach and bowels. At one time after an attack of bilious vomiting the nausea became so constant and so great, that no food, or but the smallest amount, was tolerated for days, and the patient seemed rapidly sinking from inanition. Various remedies were tried, but none had the desired effect until carbolic acid was resorted to. This, given in two drop doses, each dissolved in a drachm of water, pro re nata, accomplished its object perfectly. At first the above-named dose was given every hour; afterwards irregularly, in accordance with the patient's feelings. It enabled her to take nourishment, and she regained her strength in conse-

quence. Since then, during a period of nearly seven months, she has had repeated attacks of nausea, which she has always been able to control by the remedy exhibited as above. Its effect has been in every respect pleasant. A little lemon juice was added to conceal the taste.

CASE II.—Mrs. F., a young married lady, pregnant the second time. Had retroversion uteri and a diseased cervix. She was afflicted with nausea and vomiting during the early months of pregnancy. The usual list of medicines was gone through with, with only temporary relief. Carbolic acid in minim doses was at last prescribed, with complete success for a time; but the patient having conceived a great aversion to the taste and odor of the article, declared herself unable to take it, and it was discontinued. It seemed to be very efficacious when taken.

CASE III.—Miss D., a middle-aged lady, in the advanced stages of pulmonary phthisis. Has hectic fever, profuse sweats, abundant and characteristic expectoration of matter from the lungs, the usual physical signs of phthisis, emaciation, irritable stomach, and constipated bowels. Carbolic acid was given by the stomach, one and a half minim in solution, a short time before each meal, and by inhalation with the steam atomizer, three minims to the ounce of water, three times a day. This treatment seemed to improve the condition of the stomach somewhat, but the general symptoms were not in the least degree favorably modified, as I could discover, nor was the course of the disease shortened. The patient was taking stimulants and tonics at the same time.

CASE IV.—Mrs. M. Advanced phthisis; symptoms nearly as in the foregoing case. Carbolic acid was given by the stomach as above, with no beneficial effect, except an allaying of gastric irritability.

CASE V.—Mrs. R. Incipient phthisis, with bronchial irritation, a distressed stomach, and tendency to diarrhoea. Carbolic acid given per stomach, and by inhalation, with no permanent good effect.

CASE VI.—Mr. T. Mild asthma, accompanied or caused by bronchitis. Carbolic acid given by inhalation with the steam atomizer once every few days, apparently had the effect of curing the disease. Treatment continued for several weeks.

CASE VII.—Mrs. F. Obscure abdominal disease, attended with severe attacks of colic and constipation, followed often by diarrhoea, with mucous discharges from bowels, and the passage of masses looking

* Loc. cit.

like potato skins, and undigested food. Pain intense—great distention of colon with flatus, borborygmi, disturbance of stomach and emaciation. Carbolie acid given by the stomach in three minim doses twenty minutes before each meal, and by injection in six minim doses twice a day, to be thrown as high up into the bowels as possible, with a long rectal tube. For a time all the symptoms seemed to be ameliorated by the remedy. But after a few weeks, the trouble returned with all its old violence, and in view of the uncertainty of the long continued use of the medicine, it was deemed advisable to discontinue it.

CASE VIII.—Mrs. B., a middle-aged lady, of dark complexion, and bilious temperament. Has been suffering for some months with a bad cough, which keeps her awake nights; with loss of appetite and flesh, pains in the chest, difficulty of breathing, &c. Physical examination not decisive. Diagnosis, chronic bronchitis. She was given daily inhalations of carbolie acid with the atomizer. On some days the treatment was omitted on account of the patient's inability to attend at the office. Ten inhalations were given in all, each one lasting about a half an hour. The first gave relief, and each succeeding one still more than the others, so that after taking the number mentioned she was nearly free from cough, or so little troubled that she could sleep all night, a pleasure she had not enjoyed before for a long time. It should be remarked that a mild hepatic was prescribed at first, and an iron tonic, *vinum ferri amari*.

CASE IX.—Mrs. H., an hysterical young widow with one child. Has uterine inflammation, and suffers from reflex irritation of the stomach, and the other troubles which usually attend such diseases. Heart's action irregular. Has spells of great prostration. I was summoned to see her on the 25th of April, when she was supposed to be dying. She had vomited her food uniformly for several days, and lived only on wine. Was then feeling the reaction. Pulse feeble and intermittent. Ordered wine to be discontinued, except a very small quantity, and nourishing food to be taken at the usual time of meals, or more frequently if desired, after a dose of carbolie acid one and a half minim in a drachm of water. This stopped the vomiting, and the patient gained strength accordingly. She has used it many times since with a similar result.

CASE X.—Mrs. B., a pale, anæmic, middle-aged lady, mother of a family, of consumptive tendency. Has ascites and œde-

ma of lower extremities, no enlargement of liver, no evidence of renal disease from examination of urine. She has organic cardiac disease, which with the anæmia probably causes the dropsy. Ascites very marked, interfering with respiration. Œdema of lower extremities so great as to make locomotion very difficult. Stomach very irritable. Had taken hydragogue cathartics until she could tolerate them no longer, but threw them up almost immediately. Tongue red, sore, and fissured. There was a good deal of thirst, and distress at the epigastrium. After a further trial of cathartics in a different form, they were abandoned, and digitalis was prescribed both internally and as a liniment to back and abdomen, and the legs punctured to get rid of the liquid. An immense quantity was drained off, and the patient much relieved. The stomach, however, continued very irritable, and to remedy that I gave carbolie acid in minim and a half doses, dissolved in water, a short time before each meal. The effect was immediate, and with the aid of a tonic, *vinum ferri amari*, the patient was in a short time restored to comparative health. I may be here allowed to digress far enough from the subject, to call attention to the admirable effect of the digitalis in this case. It very notably increased the secretion of urine, which was scanty before, and steadied the action of the heart.

CASE XI.—Mr. B., father-in-law of the above—a small man, of nervous temperament, sixty-seven years of age. For three months has been failing in flesh and strength. Most prominent symptoms referred to the stomach. Distress and tenderness at the epigastrium—frequent vomiting of food, pyrosis. Has been troubled for years with a mild form of asthma; coughs now occasionally; throat and nasal passages inflamed. Has delirious spells, when his head becomes hot and face flushed. Is subject to headache. Has been under the charge of a clairvoyant physician in Boston. At the time of my first visit (Aug. 3d), he was taking three different kinds of medicines—black mixtures in large bottles. Ordered all other medicines to be discontinued, and the following to be taken:—

R. *Acidi carbolici*, ℥ xlviij.;
Aquæ cinnam.,
Aquæ puræ, āā ʒiss.

M. S. Take a teaspoonful in water five minutes before each meal. Diet bland and nutritious.

Aug. 5th.—Feels better. Says the medicine seems to go to the right spot. Has

not vomited since last visit. Pyrosis continues. Complains of throat. Ordered gargle of tannin and glycerine.

Aug. 7th.—Up and dressed. No vomiting. Stomach decidedly better. Appetite good. Gaining strength. Pyrosis less troublesome.

Aug. 16th.—Pyrosis ceased. Throat better. Bowels somewhat loose. Ordered ferri et quin. cit., grs. v., ter die. Mixture to be continued.

Aug. 22d.—Has been to Amesbury to attend funeral of sister. No return of stomach symptoms.

In this case the improvement was doubtless partly owing to his leaving off the medicines he had been taking before; yet it seems to me almost a test case in showing the value of carbohc acid in similar forms of dyspepsia.

INTERMITTENT FEVER SUCCESSFULLY TREATED BY THE IODIDE OF POTASSIUM AFTER QUININE HAD FAILED.

By S. L. ABBOT, M.D.

MAY 13th, 1869. E. S. D., law student, aged 26. Applied for treatment for intermittent fever, from which he had been suffering since the first week in April. The patient was a native of Ohio, and had had several previous attacks. On one occasion he had been treated successfully by an eminent practitioner of this city with sulphate of quinine. At that time he had taken the drug ineffectually for some time, in considerable quantities, not understanding the proper method of employing it. He was speedily relieved by large doses taken with the proper interval of time before the period of access, under his physician's directions.

During the present sickness the chills had recurred daily, and the patient had suffered much from almost constant, deep-seated pains of a rheumatic character, mostly in the chest and arms, which were most severe in the latter part of the day and at night, sometimes seriously disturbing sleep. There was some tenderness on pressure over the spleen, but no enlargement of that organ could be felt. Appetite much impaired.

R. Potass iodid., gr. v.;

Fl. ext. quassiae, f3ss.

before each meal.

18th.—Patient reported that he commenced the use of the medicine on the 14th. On the evening of that day he had a severe chill, which lasted two hours, and was fol-

lowed by fever and profuse sweating, as usual. On the 15th he had another attack, but much less severe. There had been no recurrence since. The appetite was improving; the bowels were regular, and the patient felt much better generally. Directed to continue the use of the medicine until the 21st, when the evening dose was to be omitted.

June 3d.—No chill since last report. Appetite said to be "enormous," "better than for three years." Patient says, "the medicine killed the ague in just two days." The pain in the bones ceased after the third day. It is worthy of remark that during the present attack, before applying for medical advice, the patient had taken quinine in large quantities, sometimes taking as much as twenty-four grains in a day, and in accordance with the directions previously received from the physician who formerly attended him, but without the least benefit.

I was led to prescribe iodide of potass. in this case from having employed it successfully several years since in a similar case, which had not yielded to sulphate of quinine, in which instance I was induced to employ it on account of the well-known, powerful influence which it exerts over the nervous system. In the number of the *Archives Générales de Médecine* for August of the present year, is a valuable paper on the use of iodine combined with iodide of potass. in intermittent fever, in which a number of cases of its successful employment are given.

CONGENITAL CATARACT IN CHILDREN SIMULATING NEAR-SIGHTEDNESS.

By B. JOY JEFFRIES, A.M. M.D., Ophthalmic Surgeon
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My experience with cataract in children leads me to call the attention of my professional brethren outside of the specialty, to one or two points that are deserving of attention. As we see in Fig. 1, all the rays

of light entering the pupil are brought to a focus on the retina. Congenital cataract is apt to affect the central portion of the crystalline lens, leaving the margin clear, through which the rays of light can pass to the retina, and there form a more or less