

The order of succession, says the late Dr. Bartlett, in which the several lesions commence and are developed is a matter not susceptible of very rigorous demonstration. Death almost never takes place in the disease before the termination of the first week, and not often so early as this. Still a careful study and comparison of the pathological appearances, which are presented in cases of differing durations, will enable us to arrive at a reasonably certain approximation to the truth. There can be little doubt, I think, that one of the first—probably the first, pathological alteration which takes place in the solids, consists in the tumefaction of the elliptical plate or plates nearest to the ileo-cæcal valve. This tumefaction is accompanied or followed by other changes—an afflux of fluids, softening of the mucous coat, the hard yellow transformation of the submucous tissue, and finally, by ulceration; and these several lesions, taking place first in the plates nearest to the ileo-cæcal valve, gradually and successively extend to those which are farther removed from it. Contemporaneous, probably, or nearly so, with these alterations, are the reddening, enlargement, and softening of the mesenteric glands. The enlargement of the spleen, and the diminution of its consistence, occur also, there is good reason to think, in the early stages of the disease; and the same thing is also true, though less constantly, perhaps, of the softening of the other organs. The various pathological changes which are found in the gastro-intestinal mucous membrane begin, and are developed, it would seem, at uncertain and indefinite periods during the progress of the disease.

Pathological conclusions.—It is necessary to keep in mind, that the various lesions described are not all of them to be considered as the essential elements of enteric fever; indeed, a small portion only can be viewed in this light; but it is certainly important to determine, as far as possible, the bearing which, separately or combined, they have on the pathology of this fever. This question, however much has been lately accomplished in elucidating the changes that take place in the several organs in the progress of this disease, is one of great difficulty; so complex, indeed, that it cannot be said to be susceptible of adjustment in the present state of our knowledge. Still a great step has been gained in determining the true or essential pathological element of this fever; and it may be reasonably assumed, from the fact that two important lesions are invariably present—viz., the alterations in Peyer's patches, and in the corresponding glands of the mesentery—that these two lesions constitute its true anatomical character. In this almost everyone who has investigated the subject since it was first pointed out, and I may say settled, by the greatest living authority (Louis) unhesitatingly coincides.

The other lesions, when present, are to be regarded as secondary or accidental only. Some of them, however, which are of very frequent occurrence—the alterations in the mucous membrane of the stomach, in the spleen, and in the lung, for example—have certainly great influence, and often determine the issue of the disease. And it would appear that a favourable or unfavourable result is, in many cases, to be ascribed as much to their co-existence, as to the extent or severity of the primary or essential intestinal lesion.

Another point of unquestionable importance to a right understanding of the pathology of enteric fever, if it could be settled, is the relation which the abdominal lesions bear to the phenomena of the disease. What inferences, for example, are to be deduced from the alterations in Peyer's patches? Are we justified in considering this lesion as the cause of the whole febrile phenomena; in other words, is enteric fever merely a gastro-enteritis, or a dothin-enteritis, just as inflammation of the mucous membrane of the colon is regarded as the cause of the morbid phenomena included in the term dysentery? Modern pathologists have come to the conclusion that this is not a correct mode of viewing this question.

I have before stated that the intestinal lesion and changes in the mesenteric glands are not the cause of the febrile phenomena, but only a part of the pathological elements of the fever, the whole being the result of some morbid agent, of the nature, sources, and *modus operandi* of which we are as yet entirely ignorant. The lesion of the patches certainly bears to enteric fever the same relation as the eruption of small-pox, of measles, or of scarlet fever bears to the eruptive fevers, in which diseases no one regards the cutaneous rash to be the cause or source of the febrile affection.

ROYAL ORTHOPÆDIC HOSPITAL.—At the annual Court of Governors, it was stated in the report that the number of patients admitted during the past year was 1461. The receipts of the year were £2716; the expenditure had exceeded this by £132 15s.

ON THE USE OF THE HYPOPHOSPHITES OF SODA AND OF LIME IN THE TREATMENT OF PHTHISIS.

By RICHARD QUAIN, M.D.

THE treatment of phthisis by the hypophosphites of soda and of lime was brought into notice by Dr. J. Francis Churchill, of Paris, in a communication read before the French Academy of Medicine in July, 1857. I was at that time induced, by the representations made as to the value of these agents to administer them to some of the cases under my care in the Hospital for Consumption at Brompton; but as the results were not encouraging, and as the drugs were then obtainable in limited quantities, I did not continue the experiments. One of my colleagues, Dr. Cotton, about the same time, or soon after, made some observations on the subject, and published the results, which were unsatisfactory.

Dr. Churchill subsequently brought his memoir, with additions, before the profession. A perusal of this treatise,* and inquiries addressed to me from time to time by professional friends as to my opinion of the value of the hypophosphites in the treatment of phthisis, have led me to re-examine fully into their asserted efficacy, and in this communication I propose to give briefly the results of the inquiry.

It will, perhaps, be fair to say, in the first instance, that Dr. Churchill states that he was led to adopt the use of the hypophosphites in consequence of his belief that the tuberculous diathesis depended on some disturbance in the process of sanguification; that this disturbance, which affected the inorganic and not the organic elements, was due to a deficiency and not to an excess of some one or other of these elements. He argued with himself, that it could not be the sulphur, the iron, the chlorides, or the alkalies, for these substances were daily used as remedies, without any real effect on the disease. Eliminating, then, the elements first-named, he concluded that the failure was in phosphorus as a constituent of the body.

It should here be noticed that these propositions of the author can only be regarded as theoretical speculations, inasmuch as they are unsupported by either chemical or physiological observations.

By a similar course of reasoning, but one more in accordance with physiological facts, Dr. Churchill arrived at the conclusion, that phosphorus, the missing element, could be best supplied by the administration of this body in its lowest state of oxidation, as it was thereby given in a form more capable of assimilation. With that view, he administered the hypophosphites of soda and of lime, which he declared to be prophylactic, and to be curative in every stage of the disease. He says: "I know that they will prove, not only as sure a remedy in consumption as quinine is in intermittent fever, but also as effectual a preservative as vaccination in small-pox."

Encouraged by statements like this, and by a lengthened catalogue of the phenomena of improved health which it was said resulted from the use of these remedies in Dr. Churchill's hands, I determined on giving them a fair trial in a certain number of cases. They were therefore administered in twenty-two cases, taken without selection from amongst the ordinary in-patients of the Brompton Hospital. Of this number (twenty-two), twelve were males, and ten were females.

The Stage of the Disease.—Two cases were in the first, ten in the second, and ten in the third stage of phthisis.

The Dose of the Remedy.—Dr. Churchill recommends ten to thirty grains as the dose, of either the hypophosphite of soda or of lime, daily, in any simple fluid. The dose to be increased, until the general symptoms disappear. In some cases, he prefers the one salt to the other. For example, he thinks that the salt of lime checks the expectoration, and thereby increases the cough; whilst the salt of soda is less energetic in its action. I met with nothing confirmatory of this impression. The dose given to the patients at Brompton was, in the first instance, ten grains, three times a day, except in the case of a child, when only five were given. The disease progressing, or being stationary, or the effects of the remedy being *nil*, the dose was gradually increased. Thus, in four cases, it was

* De la Cause Immédiate et du Traitement Spécifique de la Phthisie Pulmonaire. Par J. F. Churchill, D.M.P. Paris: Masson.

increased to a drachm three times a day; in ten cases, the dose reached two scruples or more; in eight, the dose remained under half a drachm. It will thus be seen that the remedy was given freely. In no case, let me add, was there any appearance of the troublesome symptoms indicated by Dr. Churchill as following large doses.

The Duration of the Treatment.—One case was under treatment for six months, one for four months, six for three months, nine for two months, five for one month. During this lengthened course of treatment, I looked anxiously, but in vain, for those marked physiological effects described by Dr. Churchill. There were no evidences of the "improved powers of innervation;" "the hair and nails did not grow more rapidly;" there was no "appearance of plethora or of fulness;" the patients did not describe "an unaccustomed sensation of feeling better and stronger after a few doses of the remedy." Nay, I would say that there was nothing more felt by the patient nor noticeable by the physician than if so many grains of carbonate of soda or prepared chalk had been taken.

The Results.—To return, then, to the more immediate object for which these agents were administered—viz., to ascertain their value in the cure of consumption—I have to state, that of the twenty-two cases, six were more or less improved while under treatment. Of these six, three were improved in but a slight degree, and only for a short time; in three the improvement was marked, but in one only of the latter has the improvement been permanent; of the two other cases, one continued using the hypophosphite for three months after leaving the hospital, during which time she grew gradually weaker, and finally died; the other, a man, after leaving the hospital, continued the treatment for some time, but gradually grew worse, and is now dying. All the other sixteen cases steadily lost ground whilst using the hypophosphites in the hospital. Happily, in six of these cases, the treatment by hypophosphite was suspended, and the usual treatment by cod-liver oil, tonics, &c., being substituted, a decided improvement in each was the result.

The following cases, including the three in which alone any useful result seemed to follow the treatment, are a few of the cases in which the hypophosphites were administered. They have been selected as being illustrative of the chief features of this treatment.

Phthisis in the first and second stages of the disease; temporary improvement whilst taking hypophosphite of soda; final result fatal.

CASE 1.—A. B—, aged twenty-two, a dressmaker, admitted on Nov. 17th, 1858: height, 5 ft. 2½ in.; weight, 8st. 7½ lb. Being predisposed on her mother's side, she had had cough for three months, with very slight expectoration; no hæmoptysis; no night sweats; and had had no other illness. The catamenia, absent since the commencement of her illness, were previously regular. Digestive organs healthy; pulse 112.

The *physical signs* were dulness and crepitation at the right apex of the chest anteriorly, with dulness and loud harsh expiration at the left apex posteriorly.

Treatment.—Hypophosphite of soda dissolved in gum mucilage was given three times a day, commencing with doses of ten grains, and gradually increased to half a drachm by the 17th December.

Result.—After twelve weeks' treatment in the hospital, there was evident improvement in health and strength; she had gained half a stone in weight, coughed less, and the crepitation at the right apex was heard only after coughing; no expectoration. The catamenia had not returned, and the pulse was still above 100.

The like treatment was subsequently continued, as an outpatient, until April; at which time she was stated to be very ill, and she died soon afterwards.

Phthisis in the first stage; improvement whilst taking hypophosphite of lime.

CASE 2.—R. C—, aged twenty-one, a shipwright, admitted Nov. 23rd, 1858: height, 5 ft. 8½ in.; weight, 8st. 10½ lb. Being predisposed to consumption on his mother's side, his illness commenced with an attack of hæmoptysis to the amount of half a pint whilst he was at work. This continued for three or four days to a slight extent. He has been losing weight and strength ever since. He stated that he had had no cough till ten days before admission, and his expectoration, which was muco-purulent in character, was in very small quantity. He had had no hæmoptysis since the first attack, and suffered no pain in the chest. His appetite was not good, and his bowels were costive; pulse 96.

The *physical signs* were dulness and bronchial breathing at the right apex.

Treatment.—For ten weeks he took the hypophosphite of lime, in doses of ten grains, gradually increased to a drachm, three times a day, dissolved in infusion of gentian; after which he had cod-liver oil alone, for two weeks, in place of the mixture.

Result.—Under the hypophosphite he improved in health and strength, and gained eleven pounds and a half. His condition then became stationary. Whilst taking the oil, he did not increase further in weight, though he felt equally well. His cough was trifling, with only slight expectoration in the morning, but he still experienced some dyspnoea on exertion. His appetite was very good, and pulse 92. The physical signs were much the same as on admission, the dulness being, perhaps, less marked, and the respiration less bronchial in character.

Dec. 1859.—This patient has not taken any medicine since he left the hospital. He has retained his improved condition, and now continues in much the same state as when he left.

Phthisis in the second stage; temporary improvement whilst taking hypophosphite of soda.

CASE 3.—M. B—, aged thirty-one, a labourer, was admitted on the 31st of January, 1859: height, 5 ft. 1½ in.; weight, 7st. 3½ lb. With no hereditary predisposition to consumption, he had coughed for two or three winters, and had had hæmoptysis to the amount of half a pint three months previously to admission, and to a less amount nine months before that. His expectoration was very purulent, and in considerable quantity; his appetite was bad; and his pulse about 100.

The *physical signs* were dulness and crepitation at the right apex, extending low down.

Treatment.—For three months he took the hypophosphite of soda dissolved in infusion of gentian, commencing with doses of ten grains, three times a day, and gradually increased in five weeks to forty grains, three times a day.

Result.—He improved during the whole time he was in hospital, steadily gaining strength; his appetite was good, cough became much less, with scarcely any expectoration, except a little greenish mucus latterly; his pulse was about 80; and, in the first two months and a half he gained nine pounds and a half, and lost two pounds in the subsequent fortnight. The crepitation at the apex of the lung disappeared altogether in front; it was still audible at the apex posteriorly; the inspiration in front was weak, and the expiration harsh.

He left the hospital with the means at his disposal of continuing the remedies. He gradually, however (after two months), began to decline, and when seen on Dec. 10th, 1859, he presented the signs of cavities in the right lung, and of progressing disease in the left.

Phthisis in the second and third stages; little or no improvement whilst taking hypophosphite of soda.

CASE 4.—C. W—, aged thirty-two, a needlewoman, was admitted on December 10th, 1858: height, 5 ft. 4 in.; weight, 7st. 8 lb. She had been out of health for five years, and was without hereditary predisposition to phthisis; but had had slight cough for a year, which became much worse six weeks before admission. Her expectoration was very purulent, rather nummulated, and very copious, and it had been occasionally streaked with blood. She had dyspnoea and pains in the chest. The catamenia were irregular, and had not appeared for six weeks. Her appetite was bad, and pulse above 100.

The *physical signs* were dulness, bronchial breathing, and crepitation on the right, with greater dulness, cavernous respiration, and crepitation on the left.

Treatment.—She had the hypophosphite of soda in doses of ten grains, gradually increased to forty grains, three times a day, dissolved in infusion of gentian and gum mucilage, and continued for twelve weeks.

Result.—Her cough became less troublesome, and the amount of sputum diminished considerably. Her appetite also improved, but she did not gain strength. Her pulse remained above 100; the catamenia did not reappear, and she lost a pound and a half in weight.

Phthisis in the first and second stages; no improvement from hypophosphite of lime; marked improvement subsequently from cod-liver oil.

CASE 5.—W. J—, aged forty-three, a blacksmith, was admitted on the 23rd November, 1858: height, 5 ft. 5½ in.; weight, 9st. 11 lb. He had no hereditary predisposition to

phthisis, but had coughed for five months after taking cold. His expectoration was purulent, but he had never had hæmoptysis. He had had no night sweats; his appetite was good; pulse 92.

The *physical signs* were dulness, bronchial respiration, and crepitation at the right apex; with dulness, deficient inspiration, and loud expiration on the left.

Treatment.—For six weeks he had the hypophosphite of lime, ten grains, which was then increased to fifty, three times a day, dissolved in gum mucilage and infusion of gentian; after which the treatment was changed to cod-liver oil, which he took for seven weeks.

Result.—Under the hypophosphite he did not progress satisfactorily—felt weaker, coughed more, and lost two pounds in weight; while the disease rather advanced in the lungs, the crepitation being still heard at the right apex, and some coarse crepitation also at the left. Soon after commencing the oil he began to improve, gaining strength and weight—five pounds and a half in all; his appetite improved; and he coughed and expectorated less.

Phthisis in the second stage; no improvement from hypophosphite of soda; subsequent improvement under other treatment.

CASE 6.—A. M. S.—, aged twenty-seven, a ladies'-maid, was admitted on Feb. 3rd, 1859: height, 5ft. 4 in.; weight, 7st. 7lb. With predisposition on her mother's side, she had had cough for three years, brought on by sleeping in a damp bed. Her expectoration was muco-purulent, but not in very great quantity. She never had hæmoptysis, pains in the chest, nor much dyspnoea. Her appetite was variable. She had lost very much in weight; and the catamenia had been absent for four months; pulse about 100.

The *physical signs* were dulness and extensive coarse crepitation on the right side. The left apex presented similar signs of disease, but with less dulness and less crepitation before and behind.

Treatment.—She had the hypophosphite of soda for three weeks, in doses of ten grains. It was then increased to forty, three times a day, dissolved in gum mucilage.

Result.—Under this treatment there was no sensible improvement. She did not gain strength, and she lost half a pound in weight. Her appetite was bad, and latterly she complained of epigastric pain, unrelieved by suspending the use of the remedy. The treatment was changed to a mixture of infusion of gentian, carbonate of soda, and diluted hydrocyanic acid, and continued for three weeks. She also took some purified cocoa-nut oil. Under this plan she certainly improved, especially during the last fortnight. Her cough was dry, but sometimes troublesome. No crepitation could be heard on the left, and only a little at the right apex. Her appetite was much better, and she gained strength and two pounds in weight. The catamenia also returned.

Phthisis in the first and third stages; no improvement from hypophosphite of soda.

CASE 7.—C. B.—, aged twenty, a shopwoman, was admitted on Nov. 3rd, 1858: height, 5ft. 1 in.; weight, 6st. 10lb. Without family predisposition to consumption, she had coughed for more than a year, with purulent expectoration, and had had hæmoptysis on three or four occasions; the catamenia were irregular; she had lost a good deal of flesh, and her appetite was bad.

The *physical signs* were dulness, with cavernous respiration and crepitation, on the right side, with loud, prolonged expiration on the left.

Treatment.—For the space of three weeks she took the hypophosphite of soda, in doses of ten grains, three times a day, in mucilage or infusion of gentian; for five weeks before this, and for three months and a half after, she had ordinary tonic treatment, with a little cod-liver oil.

Result.—She gained a little strength throughout, and the catamenia appeared regularly; but there was not much alteration in the cough. Whilst taking the hypophosphite, she lost three pounds in weight; whereas during the whole of the rest of the time she maintained her weight without loss.

Conclusions.—Reviewing the cases of which the preceding may be said to be types, we see that of twenty-two individuals labouring under phthisis, submitted to the hypophosphite treatment, sixteen derived no benefit whatever; in three the benefit was so slight and temporary as scarcely to deserve notice; in two the improvement, though marked, was temporary; and in one case the result has been satisfactory and permanent. Small as the therapeutical powers of the hypophosphites are shown

to be by these facts, are we justified in assigning to them even thus much? I think not. For we cannot forget that our cases are hospital cases; that, oppressed by sickness, care, and anxiety, they come from close, unhealthy localities; that they were more or less destitute of good food and good air. When they enter the hospital, they begin to feel the influence of hope; they live in warm, airy, and well-ventilated wards, find agreeable occupations, and have plenty of good food. Under such circumstances, the patients frequently improve in health, without the application of any medicinal agents. It would therefore be as fair to attribute the slight or temporary improvement which took place in some of these cases to hygienic as to the therapeutical agencies. Nay, further: this opinion is confirmed by the fact that two of the three cases which did best in the hospital ceased to do well when they left it.

Desirous of otherwise testing the value of these substances, I thought it would be well to compare the results of my ordinary hospital practice with that of the hypophosphite treatment. With this view, I requested my friend and late clinical assistant, Dr. Hill, (to whom I am indebted for much assistance in this inquiry, and for the notes of the preceding cases,) to make abstracts of any 22 successive cases in the hospital books. He did so, and having ascertained the results of the treatment in these cases, I find that he has given me notes of 11 males and 11 females, of whom 3 were in the first stage of the disease, 5 were in the second, and 14 in the third. It will be remembered that 12 were in the first and second stage, and 10 in the third. Thus in the former cases, the advantage was in favour of the hypophosphite cases, so far as the stages of the disease were concerned; nevertheless we find that of the cases submitted to other treatment, 16 were more or less materially or permanently benefited, whilst in 6 only did the disease progress unfavourably. Exactly the converse was the case when the hypophosphites were given. Thus there were 16 of 22 cases unrelieved. This comparative evidence is further strengthened by bearing in mind that 6 of the cases in the former series, which were unrelieved by hypophosphite treatment, did well subsequently under other treatment.

A review of the preceding facts has led me to form a most unfavourable opinion of the value of hypophosphites in the treatment of phthisis. I believe them to be comparatively, if not absolutely, useless. I have been induced to take some little pains in investigating the subject, because of the unhesitating confidence with which their value is asserted and their use recommended in certain quarters, and I have also seen in the cases of some patients who have visited Paris how much time has been thrown away by substituting the use of these salts for remedies of undoubted efficacy in controlling the progress of phthisis.

March, 1860.

NOTES ON

ATROPHY AND DEGENERATION OF THE ARTERIES, ETC.

By EDWIN CANTON, Esq., F.R.C.S.,

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PART IV.

IN the cases I have related of atrophy and degeneration of the arteries arising from indulgence in intemperate habits, I have not mentioned the state of the arteries of the brain; but, though unexamined in the above instances, I have commonly found these vessels to be affected in the same manner as those of the trunk and limbs in examples of chronic inebriety. Dr. Huss (*loc. cit.* p. 11) has frequently observed, also, another important change in the cerebral vessels, "usually, but not always, in company with atheroma of the larger bloodvessels of other parts. There is a dilatation of the arteries, both large and small, which ramify in the cerebral substance, so that on slicing the brain they appear of larger size than natural, while the coats of the larger bloodvessels likewise become brittle." In a case described by Mr. Henry Lee* of an intemperate man, aged fifty-six, with a distinct arcus senilis in each eye, and who was admitted into King's College Hospital with gangrene of the left foot, from which he died, it was found at the autopsy—besides atheroma of the aorta in the thorax and abdomen,

* Brit. and For. Med.-Chir. Rev., July, 1857, p. 226.