

On consumption and its treatment by the hypophosphates / by John C. Thorowgood.

Contributors

Thorowgood, John C. 1833-1913.

Publication/Creation

London : J. Churchill; Dublin : Fannin, 1868.

Persistent URL

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ON
CONSUMPTION
AND ITS TREATMENT
BY THE
HYPOPHOSPHITES.

BY
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PARK; LATE PHYSICIAN TO ROYAL GENERAL DISPENSARY.

Second Edition.

LONDON: JOHN CHURCHILL & SONS, NEW BURLINGTON-ST.
DUBLIN: FANNIN & CO., GRAFTON-STREET.

MDCCCLXVIII.

CONSTITUTION

AND ITS AMENDMENTS

BY

JOHN C. THORNTON, M.D., LL.D.

OF THE UNIVERSITY OF CALIFORNIA, AND OF THE
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P R E F A C E.

THE following pages are intended as a contribution to the medicinal treatment of pulmonary phthisis, and contain the notes of several cases of consumption which have been treated by me during the last five years chiefly with the Hypophosphites of Soda, Lime, and Quinine.

Much of the experience on which the observations are founded having been acquired in the out-patient room of a large hospital, the notes made are, of necessity, at times brief and scanty, and the reader may, as he looks over some few of the cases, be inclined to refer the beneficial effect to the cod-liver oil that was given together with the hypophosphite. This I am prepared for ; the fact being that my chief object in using the hypophosphites has been to cure these patients, and send them to their work as soon as possible, hence I have not thought it right to withhold anything in the way of medicine that might, in conjunction with the hypophosphite, accelerate the recovery.

In selecting the cases for publication, I have, however, tried to pick out those in which the hypophosphite treatment was complicated as little as possible by other medications.

It will be observed that in the present issue, Part I. is reprinted without alteration, so that the reader may be able to compare the two series of observations. The cases recorded in the two parts are quite distinct, and I can call to mind only one of those cases given in detail that has to my certain knowledge relapsed, although I had, in numerous instances, urged the patients to come to me at once, should any sign of returning disease appear.

Although "*res non verba*" has been the motto I have endeavoured to keep before my mind in writing these pages, yet I have, in the course of Part II., placed before the reader such views of the origin of tubercular phthisis as I have been led to form.

Without going so far as to say that a deficiency of oxydisable phosphorus in the system is the sole cause of tuberculosis, I wish, after due consideration, decidedly to avow my conviction that a deficiency of phosphorus in the system is essentially associated with some of the most

marked and intractable forms of consumption, and the evident benefit which accrues in these very cases from the administration of the hypophosphites seems strongly to support this view.

The way in which I conceive it possible that the phosphorus element is consumed by a too rapid oxydation in the lungs, before it has fulfilled those uses to which nature has appointed it, is also briefly set forth, and such facts as seem to support the theory adduced.

I cannot conclude without acknowledging the kind assistance given me by Dr. PROSSER JAMES in the work of getting these pages through the press.

JOHN C. THOROWGOOD.

61, WELBECK-STREET, CAVENDISH-SQUARE,
March, 1868.

PART I.

ON THE USE OF THE HYPOPHOSPHITES IN THE TREATMENT OF CONSUMPTION.

HYPOPHOSPHOROUS acid was first obtained as a concentrated acid solution, by Dulong, in 1816 : it is the lowest and most unstable of the acid combinations which phosphorus forms with oxygen, and (neglecting the water in its composition) it is represented by the chemical formula PO , the formulæ of the more highly oxygenated compounds known as phosphorous and phosphoric acid being PO_3 and PO_5 . As the salts formed by the combinations of these two last-named acids with bases are termed respectively phosphites and phosphates, so the combinations of the hypophosphorous acid are known as hypophosphites, salts which have a strong affinity to absorb more oxygen, and so pass into phosphates.

In consequence of this tendency on the part of the hypophosphites, they have to be prepared with great care by the chemist, and in evaporating their solutions, in order to obtain crystals, it is essential that the temperature be kept within certain limits, otherwise a mixed salt of phosphite and phosphate results, which is of no use therapeutically. Mr. John Taylor, of Liverpool, in his papers in the *Lancet* for 1861, gives ample details of the great precautions necessary to ensure the preparation of a pure and reliable hypophosphite. The salts whose therapeutic action we purpose here to study, are the Hypophosphites of Soda and Lime, and so low is the degree of oxidation of the phosphorus in these salts, that either of them will, when warmed on a spatula, take fire and burn like pure phosphorus ; a simple and ready test of the genuine nature of either salt.

The hypophosphite of soda is more deliquescent in air than the lime salt, but far less so than the hypophosphites of potash and ammonia : it crystallizes in rectangular plates, and is readily

soluble in water or alcohol, the aqueous solution is neutral, and nearly tasteless.

The hypophosphite of lime is not deliquescent, crystallizes in rectangular, or six-sided columns, has a slightly bitter taste, and when pure is perfectly soluble in water.

In appearance the lime salt resembles the hypophosphite of ammonia, but this last, on being heated, gives off free ammonia. The potash salt is a scarcely crystalline powder, and extremely deliquescent in the air.

The aqueous solutions of the hypophosphites of soda and lime are almost tasteless, and this gives them a great advantage over the phosphorized oil of the Prussian Pharmacopœia, or the ethereal tincture of phosphorus of the French codex, for either of these preparations of the drug, given even in a moderate dose of three or four drops, is most nauseous in flavour, and almost certain seriously to disturb a delicate stomach.

The chief medicinal use of phosphorus, in the form of the oily solution or ethereal tincture, has hitherto been in diseases of the nervous system, and both Dr. Radcliffe and Dr. Anstie commend it as a very useful medicine in restoring exhausted nerve force; the former of these observers suggesting, that being itself an important constituent of healthy nerve tissue, it may, when given internally, act as a nutrient to the worn-out nerve, much in the same way as the preparations of iron act as nutrients to weak and impoverished blood.

The late Dr. Glover wrote in favour of phosphorus as an excellent medicine in depressed states of the nervous system, and in constitutional struma too the oil seemed to this physician a good medicine.

Recently, a sound and excellent observer, Dr. Cotton, has tried the phosphorized oil in many cases of decided phthisis. In four out of twenty-five cases it did great good, but very many of the others who took it experienced gastric irritation and derangement, and derived no benefit in respect of the chest disease.*

In July, 1857, the attention of the French Academy of Medicine was drawn, by Dr. Francis Churchill, to the hypophosphites of soda and lime as specific remedies for pulmonary tuberculosis, on the hypothesis that the proximate cause, or at all events an essential condition, of the tubercular diathesis is the decrease in the system of the phosphorus which it contains in an oxygenizable state.

On this hypothesis the cure of the disease is to be found in presenting to the system some preparation of phosphorus, which

* See *Medical Times and Gazette*, vol. ii., 1861, page 7.

shall be directly assimilated, and be at the same time at the lowest degree of oxidation.

The hypophosphites of soda and lime are considered best adapted to fulfil these ends, and Dr. Churchill having tried these medicines on thirty-five consumptive patients, found that nine recovered, eleven improved, and fourteen of them died.

Subsequently to these announcements of Dr. Churchill's, the hypophosphites were tried by numerous observers in England, and the results of the trials, as published, are so singularly contradictory that I cannot think the same remedy can have been used by all the experimenters.

It is impossible in a short paper like this to quote all the observations that have been made, I would however refer to a most fair and impartial trial of genuine hypophosphites, made by Dr. Risdon Bennett,* in the Victoria Park Hospital, in twenty cases of true consumption, four only out of this number made marked and decided improvement, and these were in the earlier stages of the disease.

Having myself in practice employed the phosphoric and phosphorous acids with benefit in many cases of chest disease, I was anxious to try the other known compounds of phosphorus, and in consequence of inquiry on the subject, more than two years ago my attention was drawn to the hypophosphites of soda and lime as prepared by C. H. Warner & Co., of Fore-street, and the amount of phosphorus contained in these salts was demonstrated to me by the simple process of heating the salt on a knife in the way already described.

Compounds so rich in phosphorus, and so convenient of administration, promised well as means of supplying phosphorus to the system; and in the belief—be it right or wrong—that the part of the animal economy most involved in the early development of phthisis is the nervous system, or that part of it which presides over cell growth and development on the one hand, and the destructive metamorphosis of tissue on the other, I was led to employ the hypophosphites in the same way as I had employed zinc, quinine, and other nerve tonics, in the early stages of phthisical disease, with a view to some special restorative action over imperfect or irregular innervation.

I have within the last two years amassed the notes of a large number of cases in which the hypophosphites were administered, often under every extraneous disadvantage; and in very many of

* *Medical Times and Gazette*, 1861, vol. i., 438, where will be found an excellent critique on Dr. F. Churchill's theory as already stated.

these cases, decided and unmistakable good came of their administration, and that too when other well devised means of cure had proved useless. In the present paper I have given the brief notes of a few cases selected from those in which the disease was not as yet in by any means an advanced stage.

CASE I.—Rosa G., married, æt. thirty-five, living in the City, came to me August 3rd, 1863, stating that she had been ailing for more than four months with general debility, some loss of flesh, and a troublesome cough every morning when she rises.

She has never coughed up any blood, but usually expectorates a grey phlegm. Has much tightness and oppression at the chest, at times is feverish. Pulse 100, feeble.

Physical Signs.—Right subclavicular region is duller than the left, and the breath sound here harsh and tubular; elsewhere chest seems sound. Ordered nitric acid in infusum aurantii till August 11th, when she was again seen, and the cough was found to be better, but there was much dyspnœa on any exertion, with feeling of sinking and weakness at the chest. Cod-liver oil was strongly urged upon her, but she has often tried it in various ways, and is scarcely able to keep one dose on the stomach.

Under these circumstances she got :—

R Sodæ hypophosphitis, gr. iij.;
 Tinct. camph. co., ℥x.;
 Aq. camph., ℥j. M. ter die.

This mixture was taken up to August 18th, at first it caused slight nausea, but soon it was easily taken, and in one week more the patient came to say she was free from cough, could breathe well, and required no more medicine.

February 10th, 1864.—The same patient came again to me with much dragging pain in the chest, cough, quick pulse, and emaciation. Breath sounds very tubular at right infra-clavicular region and pain here as well as on left side.

R Sodæ hypophosphitis, gr. v.;
 Infus. calumbæ, ℥j. M. ter die.

Feb. 18th.—States that the mixture soon relieved her chest; to continue it and to take ℥j. of cod-liver oil twice daily.

March 3rd.—Feels almost well and is going for change to Ryde. Since then I have not heard of any relapse.

CASE II.—Mary G., æt. thirty-nine, out-patient at Hospital for Diseases of the Chest.

Jan. 4th, 1864.—Complains chiefly of much tightness and oppression at the chest, with a troublesome cough and difficult expectoration, never raised any blood.

Physical Signs.—Nothing more noted than prolonged expiration under right clavicle, and very slight dulness here.

Till Feb. 13th the treatment consisted in expectorants, and then tinctr. ferri c. liq. morphiae, but none of these medicines appear to have given any relief to the symptoms, and she got on Feb 13th :—

R Sodæ hypophosphitis, gr.v. ;
Aq. menth. pip, ℥j. M. ter die.

Feb. 22nd.—Finds so much relief to the cough and chest oppression that she asks to be discharged now as she feels well.

The respiratory signs, however, are not altered, and the morning cough with expectoration continues, though in less degree.

Repeat mixture for fourteen days, and return if not cured. She was not seen by me again.

CASE III.—Jane C., æt. twenty-one, dispensary patient, complains of much debility and exhaustion, and frequent dry hacking cough ; tongue white, appetite bad, a good deal of pain about left shoulder. Pulse 120.

Physical Signs.—Harsh and coarse breathing at left infra-clavicular and supra-spinous regions ; nothing else noted.

R Acid nitric dil., ℥x. ;
Dec. cinchon., ℥j. M. ter die.

In a week she felt stronger, but the cough was worse, and the scanty sputa visibly streaked with blood.

R Sodæ hypophosphitis, gr. v. ;
Aq. camph., ℥j. M. ter die.

After ten days of this, she came and said the medicine revived and strengthened her, cough and spit very much better. She continued taking same medicine a few weeks longer, and then left off attending. Pulse being then 80, and the cough a mere nothing.

CASE IV.—Eliza D., æt. nineteen, weak young woman, suckling an infant. Since confinement has complained much of oppression and tightness of the chest with frequent cough.

The left apex is duller than right, and respiration very jerking and uneven, chest feels tight and stuffed.

For three or four weeks the treatment consisted in the application of tr. iodin. to the left chest, and in the administration of cod-liver oil and chalybeates. At the end of a month the notes before me record no improvement, and it appears that on October 22nd five grains of hypophosphite of soda were given in aq. camphor. thrice daily, and the oil continued.

Nov. 5th.—Great improvement, less pain in chest, breathing free.

Nov. 29th.—Has continued the hypophosphite, and considers herself well.

CASE V.—Elizabeth F., æt. twenty, living in Essex, came in July, 1863, to the Hospital for Diseases of the Chest at Victoria Park. Pale complexion, has been getting weak and losing flesh, with frequent cough and pains about the chest.

July 23rd.—She was examined by Dr. Andrew, and the note of the physical signs was :—Tubular respiration with increased vocal resonance at right apex. On her being passed over to me soon after, I treated the case with cod-liver oil, nitric acid, and bark, then with syr. ferri iodid. for nearly two months, till towards the end of September the patient began to spit blood, and to show signs of the left apex being congested.

October 8th.—I gave her three grains of the hypophosphite of soda thrice daily, with twenty drops of ether in aq. camphor.

The amendment was marked and persistent, so that on November 2nd she was discharged, and I noted that in this case the physical signs underwent much improvement under the hypophosphite treatment.

CASE VI.—A widow, æt. twenty-seven, resident in the country, was sent as an out-patient to Victoria Park Hospital, having been under treatment for presumed tubercular disease of the left lung.

When seen, face was flushed, and pulse 130. She complained of frequent cough with thin expectoration, pains about chest, and shortness of breath. No hæmoptysis.

Physical Signs.—Some dulness at left infra-clavical region, with very harsh breathing. She has undergone much treatment, but has never been able to take cod-liver oil.

R. Sodæ hypophosphitis, gr. iij.

Infus. calumbæ, ℥j. M. ter die sumend.

After three weeks, came and said she felt better; pulse 120 less spit, less pain; physical signs as before. Pt. med.

In another three weeks, further improvement, and she can take a teaspoonful of oil twice in the day.

This report was given by her on December 17, 1863, and she was not again seen till April 25, 1864, when she presented herself much worse in every respect.

Note of April 25, 1864, runs thus :—She feels very weak and prostrate; at times is burnt up with fever, and at night is drowned in perspiration; severe pain on left side when she breathes, and coughs up much thick spit that sinks in water; once or twice coughed up blood. Pulse 120, weak and irritable; tongue much furred behind.

Physical Signs.—Upper left chest very tender ; moist crackling distinct ; right supra spinous fossa dull, and the breathing bronchial.

Requests some of the same medicine she had before, which did her so much good. She gets accordingly—

Sodæ hypophosphitis, gr. v.
 Infus. calumb., ℥j. M. ter.,
 and ℥j. of pale oil twice daily.

May 3rd.—Much the same. Pulse 118 ; much pain in chest, and “very heavy night sweats.”

R Calcis hypophosphitis, gr. v.
 Infus. calumb., ℥j. M. ter die sumend.

Pulv. ipecac. co., gr. v. Omni nocte.

With the exception of a week of rest from physic, the patient took the above mixture till May 23rd, when, in her own words, she felt “a new being,” with clean tongue, pulse 88, no pain, and respiration greatly improved ; slight cough and scanty expectoration.

Some months after, when engaged in the election of a child into a charitable institution, she casually called upon me, and seemed well.

CASE VII.—A little girl, æt. fourteen, coming from Kent, presented on October 19, 1863, all the signs of very incipient phthisis in the left lung. Pulse 130 ; much cough at night ; no hæmoptysis.

Physical Signs.—Slight dulness at left infra-clavicle region, and uneven tubular respiration. Nothing further.

Alkalies with bitters, cod-liver oil, and chalybeates were given till December 7, when as there seemed no improvement, she was ordered

Sodæ hypophosphitis, gr. iiij.
 Infus. calumbæ, ℥j. M. ter.
 Ol. morrh. ℥ij. Ter die.

After intervals of this medicine, with applications of iodine over left infra-clavicle region, she improved gradually, and on

July 15, 1864—was finally discharged, apparently cured.

I heard of her in August, 1865, as keeping perfectly well in all respects.

The next case is one at present under observation, in consequence of the patient having had a return of consumptive symptoms after they had been completely arrested during fourteen months by means of the hypophosphite of soda alone.

Frederick A., æt. thirty-six, a labourer, living in Bethnal-Green, came to Victoria Park Hospital, March 28, 1864, and gave the following account of himself and his ailments.

He has, till ten days ago, had as good health as any man living, his weight at one time was fourteen stone, and he could run up hill, or raise a heavy weight, without anything like dyspnœa.

Shortly before his coming as a patient, after a day of no special exertion or excitement, he awoke at two in the morning with a fit of coughing, and soon began freely to expectorate florid blood. This cough and bloody expectoration kept on at intervals for about a week, and then he sought advice.

The notes of March 28, 1864, are scanty, and run thus : Pale and anxious face, clean tongue, feeble pulse, much cough with sanguineous sputa.

Physical Signs.—Right infra-clavicular region decidedly dull, and moist sounds heard. Ordered, a mixture with dilute sulphuric acid and syrup of poppy.

April 11th.—Not much better. Chest feels very stuffed. Cough is troublesome, and the sputa mixed with blood.

R Sodæ hypophosphitis, gr. v. ;

Glycerin, ℥xx. ;

Aq. ℥j. M. ter die.

He took this up to May 16th, 1864, without any cough pill, or cod-liver oil, and by degrees the cough and spitting left him, and he returned to his work, having lost all cough, all spitting, and with a greatly improved appetite.

October 9th, 1865.—This same man came again to the hospital, and confirms the literal truth of the last note made of his case. Since then he has remained so well that he has not lost one day's work ; but during the last week the cough has returned, and the sputa is again very much mixed with blood. He feels much oppression at the chest, chiefly on the right side, and here there is dulness and numerous humid clicks. The respiration in the left lung is very feeble.

Tincture of iodine applied to right chest, and five grains of hypophosphite of soda given three times a day in camphor water.

October 16th.—Feels much better. After three days of the mixture the cough was better, and the sputa free from blood. Pulse 84, tongue clean, looks pale and thin about the face, and says he has emaciated a good deal lately.

Continue medicine and take ol. morrh. ℥ij. ter die.*

CASE IX.—William P., æt. fourteen, living at Plumstead, came to Victoria Park Hospital, December 14, 1863, in the following state :—He is a pale, thin lad, complains of constant cough with

* He could not take the oil, but has since returned to work quite well, and perceptibly gains flesh.

much expectoration, loss of flesh and strength, and frequent attacks of diarrhœa.

Physical Signs.—Left chest is flattened, very dull on percussion, and its upper half is full of moist crepitation. Right lung expands fairly, respiration in it is harsh, and expiration notably prolonged at infra-clavicular region. He states that he has been ill for three years, and has taken much cod-liver oil.

R. Ol. morrh. ℥ij. ter die.
Calcis hypophosphitis, gr. v.;
Decoct. cinchon., ℥j. M. ter die.

December 21st.—Much the same; continue for fourteen days.

January 11th, 1864.—Feels much better. Pulse 96, spit is very much less. Diarrhœa ceased.

25th.—Progressing well. Pulse 96. Much less moist sound in left lung, but at one spot respiration is very bronchial as if a small cavity had formed. The boy looking very pale and anæmic, got in place of the hypophosphite and bark,

Tinctr. ferri. ℥x.;
Infus. calumbæ, ℥j. M. ter.
Pt. ol.

February 8th.—Decidedly worse for the change in the medicine. Diarrhœa returned and pulse risen to 100. Cough and expectoration not increased. Resume hypophosphite and bark as before.

He soon improved again, lost his cough, gained flesh and strength, and on April 4th he was let go with a quinine mixture to take for a fortnight.

The moist sounds in the left lung were almost gone, but the bronchial breathing over a small space made me think a cavity must have formed.

Nothing more was seen of this patient till May 15, 1865, when he again presented himself. He says that after his discharge on April 4, 1864, he kept in good health up to six weeks back, when the cough returned, with profuse expectoration, and sickness and vomiting. The diarrhœa also has of late troubled him much.

The signs of a cavity in the left lung are most unmistakable now, and some moist clicks are distinct in the right lung. Pulse 124. Ordered ol. morrh. ℥ij. ter die., and tinc. ferri c. liq. morphia for fourteen days.

May 29th.—No better in any respect; vomits his food when he coughs.

Continue the oil and take, in place of the morphia and steel mixture,
Calcis hypophosphitis, gr. iij.;
Decoct. cinchon, ℥ss. M. ter die.

June 12th.—Much better ; less cough, less expectoration, and no diarrhoea ; continue treatment for a fortnight.

He improved considerably, but left off attending before I was at all satisfied as to the disease being fairly arrested.

CASE X.—Early in January, 1864, a pale, emaciated man, not long out of the workhouse, came to me as an hospital patient, and told me that his illness commenced nine months back, with attacks of profuse hæmoptysis. From that time to this he has been losing strength and flesh, has much cough with often bloody expectoration, and is so short breathed that he can hardly walk across the room, and can speak but few consecutive words at a time. Pulse 124 ; tongue large and clean.

Physical Signs.—Breathing very bronchial at right infraclavicle, with moist sounds, and also at right supra-spinous fossa ; bronchophony decided in both these places. The lower part of the left lung seems the seat of some congestion, as evidenced by impaired resonance, and a good deal of fine crepitation at its base.

There was probably at this time some sub-acute pneumonia going on in the left lung. This would to some extent account for the great dyspnoea of the patient on moving. He received a liniment, cod-liver oil, and five grains of hypophosphite of lime, to be taken thrice daily in camphor water.

By January 23rd he had made great and unmistakable improvement, and the left lung seemed much clearer. To continue mixture and oil.

This man, though living in great poverty, continued, with a few short intervals, the treatment by the hypophosphite of lime with cod-liver oil, and now and then a chalybeate mixture by way of a change, till September, 1865, when he felt so well and strong that he returned to his work as a weaver, the cough scarcely troubles him, and he has now no hæmoptysis, but his breath is short, and there seems a quiescent cavity in the top of the right lung.

CASE XI.—The next case is one which exemplifies well the action of the hypophosphite of soda given with an alkali.

Mrs. A., æt. thirty-six, in comfortable circumstances and the mother of several children, came to me on December 29th, 1864, with the following history of the commencement of her illness:—

She has always been delicate, and had a cough with expectoration, often sanguineous, for several years ; about two months ago she was confined, and soon after, her chest troubled her very much, and the two medical men who attended her agreed that the right lung was much congested in its upper part.

After her previous confinements she has been troubled from the

glands in the neck swelling, and more than once suppuration has taken place, but after this confinement nothing of the kind took place, while an obstinate cough with bloody expectoration hung about her most persistently.

The appetite is fair, but there is a bitter taste in the mouth, and she is liable to bilious attacks, and quite unable to bear the smallest dose of cod-liver oil. The tongue is large with furred centre, and red edges. Pulse 108, feeble.

Physical Signs.—Right lung seems improving, the percussion note is rather dull, in parts breathing is extremely feeble, at other parts it is tubular.

Left lung is noted as "suspicious," at the acromial angle clicking sounds can be heard.

R Sodæ hypophosphitis, gr. v. ;
Sodæ bicarb., gr. x. ;
Infus. calumbæ, ℥j.—M. ter.

January 2nd, 1865.—Less tightness about the chest, less palpitation of the heart, cough and expectoration very troublesome. Pulse 104.

Continue the same mixture.

The medicine was continued till Feb. 6th, when she felt herself almost well, very little cough, and hardly any expectoration. She remarks that her spirits are much better. Respiration in the right lung is still feeble, but the left seems quite sound.

March 6th.—She was seen, and then had at times a little cough in the morning, otherwise she seemed in good health.

It is well-known that consumptive females are apt to experience a fresh start of the disease soon after their confinement, this being probably due to an excess of plastic material being thrown into the circulation, and this not being properly eliminated, is deposited in the lungs as tubercle.* This patient, in addition to increase of chest symptoms after previous confinements, had suffered also from suppuration of the cervical glands, and thus probably an outlet was afforded to tubercular mischief in the constitution. At this last confinement there was none of this gland affection, while the chest symptoms were more threatening than on any previous occasion. In the treatment nothing was given except the hypophosphite of soda in an alkaline infusion of calumba, and the result was all that could be desired; what few suspicious signs there were in the left lung went quite away, the tubular breathing in the right lung got

* See a work "On Phthisis," by Dr. Godwin Timms, page 182. A book full of original thought throughout, and well worthy the perusal of all interested in the nature and treatment of this disease.

much better, though the general feeble breathing in this lung will probably always continue to exist.

CASE XII.—John H., æt. eight years, of remarkably strumous aspect, came with his father to Victoria Park Hospital, September 22, 1864. Has been ill for several weeks with cough and expectoration, and has rapidly lost flesh and strength, he has never coughed up any blood, and his present ailment is believed to have commenced with a cold and a cough. Pulse is 120; tongue clean and moist; skin cool.

Physical Signs.—Left lung good; right, dull on percussion, and abundance of crepitation heard all over its upper third.

R Sodæ Hypophos, gr. iij.

Infus. Serpentariæ, ℥ ss. ter. die.

with lin. terebinth. to right chest.

Sept. 29.—Less moist sound in right lung, and general state improved. Tinct. iodine applied over right front, and a teaspoonful of cod-liver oil given three times a-day; continue mixture.

In a month from this time he had gained flesh and strength, could breathe freely, and the only physical sign noted was harsh respiration over the right chest.

I have not room to give the notes of two other cases remarkably similar to this one; in the one, a long and most judicious course of treatment had been for a long time followed to no purpose, while the hypophosphite of soda in six weeks' time had cleared off all the moist sounds from the lung, and made the patient feel quite well enough to resume his duties as landlord of a country inn.

The other was the case of a small boy, and the hypophosphite and sea air must divide the credit of a most satisfactory result between them in this case; a few moist sounds can yet be heard at the top of either lung.

Not to occupy attention with the details of more cases, I would just say that those already recorded are taken from 115 cases of phthisis, treated partly or entirely with hypophosphites, of which I have kept notes, and out of this number I have been able to set down twenty as most decidedly and permanently benefitted by the use of the hypophosphites of soda and lime. In five of these, cavities seemed to have formed, and in the other fifteen the disease had in every instance gone to the extent of producing moist sounds in the respiration varying in extent and degree. In thirty-four other cases, where the evidence of the disease was very decided, great relief was gained from the hypophosphite treatment, more, perhaps, than by any other medicine employed.

Of the remaining sixty-one I can only state that nothing very

noteworthy is to be said, many of these were not regular in attendance, about twelve were very doubtful cases as to the real establishment of phthisis, and in some five or six that were certainly phthisical, the hypophosphite of soda seems actually injurious, one man with the disease in its second stage in both lungs nearly always found the hypophosphite to cause hæmoptysis, others said it seemed "very trying to the chest," but this is the worst I have to tell of my experience of the hypophosphites.

Of the 115 cases of which I have kept notes, 100 certainly were true cases of phthisis in various stages of the disease, and, as has been already stated, twenty of the patients derived so much benefit as to be able to go about their usual occupations and desist from medicine. One of them, a case with extensive disease in the left lung, has lately shown a tendency to relapse, but the very unhealthy locality in which this patient dwells, and other unfavourable circumstances, must to some extent answer for this relapse.

Comparing my own figures with those of others, I find that in Dr. Risdon Bennett's twenty cases, already referred to, four were dismissed as greatly improved, giving a percentage of twenty per cent. as successful cases.*

Dr. F. Churchill, out of thirty-five cases, gives nine cures, being 25·7 per cent. Dr. Cotton, in his cases treated by phosphorus itself, gives four out of twenty-five, or sixteen per cent. as much ameliorated.†

In cases of advanced phthisis with cavities in the lungs, I have seen wonderful relief obtained in dyspnœa by the hypophosphite of soda given with ether and camphor water, and by alternating this remedy with various chalybeate medicines, I have been able to effect an amount of benefit that has surprised me. One young man who when first seen could not walk one mile, after two months' treatment, walked one day twelve miles, as he himself told me; his lungs were both extensively diseased; he lived in a very close locality, and eventually sank under his disease, but the benefit that ensued for a time under the medicine was great. In conclusion, I would urge a further trial of the hypophosphites of lime and soda in pulmonary consumption, not as specifics for the cure of every case of this complaint, but as useful adjuvants in the treatment of the disease in some of its various stages.

Note.—With respect to the genuineness and purity of a hypophosphite, I would just add, that Dr. F. Churchill's preparations, as made by Swann, of Paris, and sold now by many of the London chemists, have always seemed to me reliable and efficient medicines.

* *Medical Times*, 1861. Vol. i., p. 439.

† *Medical Times*, 1861. Vol. ii., p. 7.

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PART II.

FURTHER NOTES ON THE USE OF HYPOPHOSPHITES IN THE TREATMENT OF CONSUMPTION.

INCREASING experience in the use of the hypophosphites of Lime, Soda, and Quinine, in the treatment of pulmonary disease, has afforded me results that I feel bound to regard as both favourable and encouraging.

The question now is, exactly to ascertain under what conditions of individual constitution, and local pulmonary disease, the curative effects of these hypophosphites are best displayed, for, it must be remembered, that a medicine becomes a remedy in proportion to its judicious, and well chosen application, so that a sound practice of treatment must rest on a careful and complete diagnosis as its true foundation.

The more recent writers on consumption and its treatment, have given us something more than mere elaborate descriptions of those morbid changes caused by tubercle in the lungs, which are but secondary phenomena of the true disease; they have drawn our attention to the malady as a constitutional, rather than as a local one, and we find now steel, quinine, cod-liver oil, and dry bracing climates, coming forth as remedial measures, to supersede blood-letting, expectorants, opiates, and hot and humid climates, which appear to have comprised the usual method of dealing with pulmonary consumption in years now passed away.

Notwithstanding these signs of advanced knowledge and improved practice, we have still much to look for before we can boast of complete success in the treatment of consumption; and I would here refer to the observations made by that experienced physician, Dr. Williams, in his lectures given before the College of Physicians in the year 1862, as indicating how matters appear at present to stand with respect to the curative treatment of phthisis pulmonalis.

"During seven years," says Dr. Williams, "I have observed 6000 cases of phthisis, and of these only 24 proved real cures; cases, that is to say, in which from two to eighteen years have elapsed without any sign of progressive disease. Then, there are 31 patients who have survived with more or less of the signs of disease progressing, but with little suffering, for periods varying from six to thirty-one years. These may, ultimately, be cases of cure. Another set, comprising twenty cases, consists of patients who survived from six to sixteen years, with various degrees of disease, but who are now probably dead."

"This short list, only seventy-five in all, contains all the cases among those 6000 in which any sort of success can be claimed."

"The result is discouraging enough, but when so great strides towards the prevention of the disease and the prolongation of life have already been made, we have no need to despair."—*Medical Times and Gazette*, 1862, p. 434.

Years ago, according to Laennec and others, the average duration of life among the consumptive, was about two years. Now, it appears, thanks to the introduction of cod-liver oil, by Dr. Hughes Bennett, and a more improved system of constitutional treatment, this duration is prolonged to four years; so, within a few years, the average duration of life with the consumptive has been actually doubled, a matter both of satisfaction and of promise.

My own conviction is, that in the introduction of the use of some of the compounds of hypophosphorous acid, and I allude chiefly to the hypophosphites of soda, lime, and quinine, a decided step has been gained in the actual drug treatment of pulmonary consumption.

Having now been in the habit of using these medicines pretty frequently during the last five years, I am able to say that my faith in their remedial power becomes more and more confirmed; while I recognize the fact that these hypophosphites require to be given with discrimination and care, otherwise, not only no benefit, but even actual mischief, will result from their administration.

The reader will be, in a measure, able to judge by perusing the short notes of cases, in what description of patient, and in what state of lung, the hypophosphites are most indicated as the appropriate medicine. It is well-known that the introducer of these valuable therapeutic agents was Dr. Francis Churchill, of Paris, and since their introduction in 1857, their use has become very general, not only in France and in England, but also in Belgium, Spain, the West Indies, and America. Twenty-nine practitioners in these parts have published their testimony in favour of the hypophosphites as

useful remedies in the treatment of phthisis, and have recorded some remarkable instances of cure :—*

In Dr. Churchill's larger work, (2nd edition, 1863), are given full records of 133 cases of true phthisis, treated almost entirely by means of the hypophosphites of lime and soda, with a degree of success that is most striking, as will be seen by regarding the following figures :—

Thus, turning to page 567, we find that out of 79 patients, there were 25 who presented signs of tubercles in one lung only, and of this number 11 are recorded as cured.

Of the 54 who presented signs of both lungs being diseased, confirmative results are recorded in 25 instances, of which 16 are reckoned as real cures.

Out of these 79 cases, 50 were considered in the second stage of phthisis ; of these, 18 had but one lung affected, and the cures were 9, while of the remaining 32 who had both lungs in the second stage, a complete cure was obtained in 13 instances.

It should be observed that each one of these cases is reported most fully, these reports filling the first 550 pages of Dr. Churchill's work ; then comes the tabulated summary of results, some of which I have briefly quoted above, to show with what great success this method of treating consumption has been attended.

In an appendix to the work are grouped together 20 cases of phthisis, advanced to the third degree, cavities having formed in the lungs, and in all these cases the disease was arrested by treatment extending over a period of from six to twenty months ; the note made at the termination of each case reading thus :—"Disappearance of the general symptoms, persistence of the signs of an excavation in the lung."

The patients were thus brought into a state of comparative health though bearing about in their lungs "quiescent" or "tolerated" cavities.

To bring a case of phthisis, in its third stage, to this very satisfactory condition, will be allowed by all to be a great triumph of the healing art.

I have been obliged to condense to the utmost these extracts from Dr. Churchill's work, but enough has been adduced to show what an interest attaches to a fair trial of these hypophosphites in all the stages of consumption, and I would beg any one entering upon such a trial, to do so in the spirit inculcated by the fair and

* See *Receuil d'observations, memoires, rapports et documents, sur le traitement des Maladies de Poitrine au moyen des Hypophosphites.* Par J. F. Churchill, D.M.P. Paris. 1866.

able reviewer of Dr. Churchill's work in the *Lancet* of September 3, 1864, who thus commences his article :—

“ Dr. Churchill has fairly made good his claim to a second hearing. Our readers do not need to be informed that the views which he originally propounded in 1857, encountered a very formidable opposition, and were, in fact, totally rejected by a large number of the highest authorities on the treatment of phthisis. The principal *gravamen* of the case against these views, was the charge, that they were based, to a great degree, on mere theoretic speculation, unsupported by a sufficient number of carefully observed facts ; and it is the merest justice to say, that on this score, the present edition of Dr. Churchill's work tends, very materially, to weaken the position of his antagonists, since it records a body of no less than 133 fully detailed cases of phthisis, treated according to the method which he advocates, the result of which, certainly, appears amply to bear out his views, so far as regards the efficacy of the treatment. This single fact would fully entitle the author to claim from his opponents a careful revision of their opinions, and in the interests of science and humanity, we would urge that this revision should be strictly and impartially carried out.”—*Lancet*, 1864, page 268.

In illustration of my own experience in the treatment of phthisis by means of certain of the hypophosphites, among hospital and other patients, I now proceed to give the notes of a few cases, in which the curative power of these medicines seemed to me to be well displayed.

CASE I. is that of a young lady who has called upon me while I have been writing these pages, to inform me that she is now perfectly well, has no cough, no difficulty in breathing, and during the last six months has gained many pounds in weight, so that she considers herself perfectly cured.

Her previous history is as follows :—

Miss S., seen by me in September, 1864, aged 18, complaining of pain in chest, weakness, emaciation, and much cough, with bloody expectoration. Slight dulness, with tubular uneven breathing at the apex of the left lung. Pulse 120. Tongue clean. Father and some of her sisters died of phthisis. She was ordered 5 grs. of hypophosphate of soda three times in the day, and sent to the sea-side, and in a month I heard she was better.

I have no further note till February, 1866, when I again saw this patient. The cough had returned with increase of hæmoptysis and expectoration, and the complaint of general langour and exhaustion was great.

Apex of left lung dull ; respiration very harsh and jerking ; right

lung weak ; heart palpitates much ; pulse 100. She does not seem able to take cod-liver oil, and after giving her directions for diet, rest, exercise, and so forth, I bade her get a bottle of the pills of hypophosphite of quinine, as prepared by Swann, of Paris, and take one pill three times in the day. The consequence of this treatment was a steady, progressive amendment in every respect, and the last note made of this case is that with which this report begins.

This, therefore, may be regarded as a case of phthisis (a disease hereditary in the family) in its early stage, attended with much exhaustion of force, hæmoptysis, and congestion of the lung apex, just the state in which hypophosphite of quinine promises well, and here after several bottles of the pills had been taken, at intervals, the cure was perfect.

In the next case the lung disease was much more advanced.

CASE II.—Mrs. M., had spent much of her life in India, and, when seen by me, in October, 1865, was the mother of a small baby of ten months old. She was much emaciated and exhausted, with a pulse of 120 ; frequent diarrhœa ; fever and sweating at night ; constant cough, with purulent expectoration, often mixed with blood ; abundant loose crepitation, audible all over the upper left front, and slightly too at the right acromial angle.

This patient took cod-liver oil and iodide of iron, with glycerine for two weeks, and at the end of that time was worse, so that we were glad to have the opinion of Dr. Williams upon the case. At the consultation it was evident that a cavity had now formed in the left lung, and Dr. Williams gave it as his opinion that the case might be brought to a chronic state, and the patient live yet for some time ; a sound prognosis as the event seems to prove. The remedies now employed consisted of tannin with phosphoric acid, cod-liver oil, and a morphia pill at night, and in the after-treatment of the case I caused the patient now and then to change the phosphoric acid mixture for pills of hypophosphite of quinine (Swann's), this I did with the more confidence, as I found, on inquiry, that Dr. Williams himself approved of, and used, the hypophosphites in certain cases.

The result of this mixed treatment, and of two winter's passed at St. Leonard's, was such, that at the present time this patient is so well, that she is on her way back to India, having, as it seems to me, a dry quiescent cavity in her left lung, and fair breathing in her right.

This, therefore, was a case of phthisis in its third stage, and at times, things were very unpromising, as the detailed notes can prove ; the disease seemed, however, to be perfectly arrested by

peculiarly good climatic influences, phosphoric acid, hypophosphite of quinine, and a prolonged course of Möller's cod-liver oil. The patient was warm in her praises of this last article, and took quite a stock of it with her to Calcutta.

Here is a case in which a cavity had formed in the lung.

CASE III.—Eliza H., æt. 7; seen in June, 1867; a pale, weak child; ill for a long time with cough and expectoration, very thin, and has profuse night sweats. On examination of the chest, the breathing is noted as weak in the right lung, while in the upper part of the left there is a cavernous breathing, pectoriloquy, and some moist gurgling sounds, showing that there is a cavity in this left lung.

The child has never been able to take cod-liver oil. Under these circumstances she was ordered the hypophosphite of lime, with glycerine in water, and in three weeks had mended considerably, the cough was less, and the cavity seemed to get drier.

After three weeks, as she looked very pale, she had some of the syrup of the iodide of iron, and after six weeks of treatment, she was let go with good breathing in the right lung, and with the cavity in the left in a quiescent state, though still there was some cough and expectoration in the morning.

This case resembles that of William P., at page 10 of Part I. In both cases the hypophosphite of lime seemed to arrest the progress of the disease in the lungs; in the case just reported, a course of iron followed the hypophosphite with advantage, while, in the other case, iron with calumba certainly did harm and interrupted the cure.

CASE IV. illustrates well the effect of the hypophosphite of lime in checking the progress of consumption, even when it had reached an advanced stage:—

Charles H., æt. 18, an engine-cleaner, was taken ill in January, 1867, with severe cough, and frequent attacks of rather free hæmoptysis, strength rapidly declined, and, on February 4, he was assisted by two friends into the room to be examined for admission as an in-patient of Victoria Park Hospital.

His look was markedly phthisical, with hectic flush on cheeks; eyes dark and clear; weakness extreme; much loose large crepitation heard all over upper part of left lung; some crackling sounds also in right chest.

He was not deemed a fit case to be taken into the hospital; he had, indeed, every sign of having steadily advanced to the last stage of phthisis; night sweats were troublesome; he had no appetite, and it was satisfactory to hear that he got back home alive.

The only medicine ordered for him was five grains of the hypo-

phosphite of lime, in mint water, three times a day. From the time he commenced this medicine, improvement set in, so that in the summer he was able to go into the country, taking at that time cod-liver oil and quinine.

August 12, 1867.—He came to show himself on his return from the country previous to returning to his work. He has no cough at all; appetite good; strength and flesh returned; chest flattened; percussion dullish; respiration harsh, with prolonged expiration; at bases, respiration and percussion good. His only complaint is of severe lumbar pain, for which he was ordered an emplastrum ferri; he was further advised to continue his cod-liver oil, and he went back to his rather laborious work.

October 28.—He was seen, and, to all appearance, was quite well.

January, 1868.—As I feared, there is a return of cough, but nothing more than harsh breathing can be detected in the chest. Ordered to take six grains of hypophosphite of soda three times in the day.

After taking this medicine for one fortnight, I learned that his cough had ceased, and that he had returned to work in good health.

CASE V. affords another instance of the arrest of advanced phthisis; the ultimately fatal result was due to the patient's imprudence:

C. W., a well-grown man, aged 34, of healthy parentage, came to me on June 14, 1866, evidently in a far advanced stage of pulmonary disease. His history was as follows:—

Fourteen months ago, having previously been in good health, he began to cough and spit blood freely; he lost flesh fast, and though treated by a well-known physician, his disease continued in unabated force, and when I examined his chest, the right side was quite dull, breathing quite cavernous, with gurgling and tinkling noises intermixed. On the left side there was some moist crackling about the apex. Pulse 120. Much thick expectoration and heavy damp sweats day and night. Feels very weak.

Ordered five gr. sodæ hypophos: c., five gr. sodæ carb: in water, three times daily.

June 21st.—Much better; eats better; less spitting; pulse 120.

28th.—R Pil. morph. one-sixth gr. every night, as he does not sleep well.

By the end of August he seemed very much better; there had been one or two slight returns of hæmoptysis, but the expectoration was much less, and the gurgling noises over the right chest were replaced by dry creaking sounds, with hollow cavernous breathing, and great dulness on percussion.

He was ordered to take cod-liver oil with some tr. ferri, and he went on well till the end of October, when he went to spend the winter at Bournemouth. For some time I heard nothing of him, but in the following spring in answer to inquiry, I learned that before he left London, as he felt so much better, he got married, and rode all the way to Bournemouth with his face to a cold wind, stating, in answer to the urgent remonstrances of his wife, that the air would do him good.

In this he was quite wrong, for he got a bad attack of bronchitis, which caused his death just one month after his marriage.

I might detail three or four more cases of patients now under observation, with unmistakable cavities in the lung, and yet who hold their ground well, with the help of drachm doses of the syrup of hypophosphite of lime, and, at times, for a change, cod-liver oil, and tr. ferri.

These cases were all, so far as I could judge, free from complication in the way of disease of the liver, kidneys, or larynx; the absence of such complications, I find to be a very great point in judging of the probability of arresting the lung disease.

I now take from my note-books some more cases to illustrate the effect of the hypophosphites in the earlier stages of consumption.

CASE VI.—Wm. G., æt. 40., lives in Essex, seen July 30, 1866. Has had cough and hæmoptysis for sixteen weeks, with loss of flesh and strength.

Left upper chest dullish, with some crackling sounds. Right is not clear on percussion, and breath sounds very feeble. Ordered 5 grains of hypophosphite of soda three times a-day in infus. calumbæ. From this medicine he derived much benefit, but in August, as he complained of exhausting night-sweats, it was changed to the hypophosphite of lime.

September 24.—Let go much amended; has gained in flesh and strength, still has some cough, with yellow expectoration, and respiratory sounds are feeble in both lungs.

December 3, 1866.—A bad relapse. Cracklings distinct at upper left chest, much thick spit. He was now ordered cod-liver oil as well as the hypophosphite of lime, and by December 31st he felt himself quite well again; "nothing near so much cough and spit," no more hæmoptysis; pulse 72; appetite good.

He went on very well for two months, and then the cough returned with free expectoration. This time I gave him the liquor calcis saccharat. of the B.P. in half drachm doses, to see if its effect was the same as that of the hypophosphite of lime, but even though he had cod-liver oil, he got no relief till 5 grains of hypophosphite of

lime were added to his mixture; then he improved, and is at the present time in very fair health.

CASE VII.—Benjamin B., æt. 8 years. A short time ago this boy's father died of phthisis; the boy himself has been long troubled with cough, and has been refused admission into an orphan home, as the examining physician reported both his lungs to be unsound. In consequence of this report his mother brought him to Victoria Park Hospital in the spring of the present year. He is very pale, and losing flesh fast, while on both sides of the chest crepitating râles are heard below the clavicles.

Ordered 3 grains of hypophosphite of lime, with 10 drops of the liq. calc. sacc., B.P., in water three times daily.

Gradually this boy regained flesh, the râles vanished entirely from his breathing; in a short time he was able to take cod-liver oil, and in two months was dismissed perfectly well, and has remained so ever since.

About the same time that this boy was under treatment, a patient came to me who, in the year 1864, was for a long time under my care for cough, with purulent expectoration and frequent hæmoptysis, moist cracklings being audible in the left lung. Various remedies were tried to no purpose. At last, under the influence of the hypophosphite of soda in camphor water, all these symptoms grew much better, and the young man at once ceased further attendance, having, apparently, an aversion to doctors and physic. I judged he would soon have a relapse, and probably die, but early in the year 1867 he came before me, bringing a young relative for whom he wished me to prescribe, and I was able then to certify to myself, and a friend who was with me, that the cure had been both perfect and permanent; the youth told me he had strictly followed my advice to be much out of doors, had joined the volunteers, and had been all through the fatigues of the Brighton review, feeling all the better for it.

In three, somewhat similar, cases occurring among young men, the symptoms being cough, emaciation, hæmoptysis, and irregular breathing, with some little crackling at the lung apex, the hypophosphite of soda was given in camphor water, and rest from work enjoined for a few weeks. Two of the patients were able to return to work, and have continued well; the third, whom I have had now for three years under observation, got well at first so fast, that he himself said, "I did not think I could have improved so fast in so short a time;" yet still there was very distinct crackling in the right chest, and recently signs of a small cavity have appeared, so that I have been obliged to make this patient leave London to pass the winter at St. Leonard's.

CASE VIII.—James R., seen May 9, 1867. Pale, thin man, losing flesh rather fast, much cough, and now and then hæmoptysis. Left lung full of moist crackling; pulse 104, no fever; cold sweats at night. Cannot take cod-liver oil, as it always sickens him.

Ordered 5 grains of hypophosphite of soda, in camphor water, three times daily.

He gradually improved, and the moist crackling in the left lung was, by degrees, replaced by a dry creaking sound; at the same time the cough got better, and he did not spit "nothing near so much" as formerly.

He was soon able to begin cod-liver oil, and eventually left to go to his home in Wales, feeling himself quite well.

CASE IX.—Elizabeth D., æt. 35, living at Poplar; she has been under treatment for about one month for free hæmoptysis and cough, exhaustion, and much tightness and oppression at the chest, with subternal and intra-scapular pain.

Percussion note is fair; breathing very feeble at both infraclavicular regions, and under the right clavicle clicking sounds are evident.

The medicines that have been hitherto employed have been opiates, tonics, and cough mixtures, but the disease appears in no way influenced by them; indeed, the patient is conscious of feeling worse than when she first came under my treatment.

She now had 5 grains of hypophosphite of soda, in camphor water, three times a-day, and one teaspoonful of cod-liver oil after meals. She continued this treatment for a month, and was then discharged with complete loss of all chest pain, scarcely any cough, not a trace of blood in the expectoration, and no morbid sounds to be heard in the chest.

This patient, while taking the hypophosphite, was able to digest and assimilate a small quantity of cod-liver oil, and I find it not uncommon for persons to be able to digest the oil after a course of hypophosphite of soda, whereas before they have been perfectly unable to retain it on the stomach.

CASE X.—M. V., a shoemaker, æt. 25. In July, 1862, this man states that he was an in-patient of Victoria Park Hospital, and was then set down as in the second stage of phthisis. He was under the care of Dr. Peacock, and improved greatly during his stay in the hospital, gaining much, both in weight and strength, and leaving very greatly improved. His weight on leaving was 7 st. 2 lbs.

December, 1862, he had to become an out-patient under Dr. Ingram, and the note recorded softening going on in the upper part

of the left lung, no hæmoptysis. He was treated with cod-liver oil, quinine, and steel, and got somewhat better.

October 16, 1865.—I saw him for the first time, he had then much thick yellow expectoration, and abundant loose crepitation, audible all over the upper half of the left lung; clicking sounds are heard also over the right lung.

He now got 5 grains hypophosphite of soda in camphor water as his only medicine, and began at once to amend; after a few weeks he had 3ij. of oil three times a-day, and on January 29, 1866, he remarks that his weight is now 8 st. 5 lbs. The expectoration, from being thick and yellow, is now described as diminished in quantity, and of a watery nature. The left chest is dull and flattened, a few moist crackling noises are heard, with very weak breathing. The breathing in the right lung is weak, but free from any abnormal sound.

This man has remained since in very good health.

It was noted here, how, as the man got better, the thick yellow copious expectoration became smaller in quantity, and changed in quality to what was described as a thin, watery, scanty, spit. Precisely the same change was noted in the case of C. W. (No. V).

Another point noted, was the feebleness of the respiratory murmur in the lungs as they got free of crackling and gurgling noises. In several cases of well-marked arrest of rather advanced phthisis, I have observed this great weakness of the breathing, and I believe it is due to a large number of the air-cells being obliterated in the process of healing that goes on in the lung, for, coincidently with this change in the sound of the respiration, I have observed flattening of the chest wall, and some impairment of resonance in the percussion note.

If, by any chance, these cases of arrested phthisis contract an attack of acute bronchitis or pneumonia, the danger of a fatal result is very great, and after death a good deal of fibrous tissue is found in the lung, though, possibly, there may be but small signs found of real tubercle remaining in the lungs.

CASE XI.—This case was a good one to test the powers of the hypophosphite of soda.

Henry G., a thin, pale man, with crackling sounds in the respiration over the left chest, much cough, and thick expectoration, with emaciation; got 5 grains of hypophosphite of soda in camphor water on April 15th, 1867.

On the 29th he declared himself quite free from cough and spitting, his chest is sore, and he remarks that what he has been taking "seems a very wonderful medicine."

Ordered to continue the medicine, and take ℥ij. of cod-liver oil three times daily.

June 1st.—Let go cured ; respiration good on both sides of chest.

July.—Return of cough, very prolonged expiration at left apex, much substernal soreness.

This time he was ordered vin. ipecac. c. tr. opii. c. potass. nitrat. ; the result noted was increase of cough and spitting ; a change to the hypophosphite of soda soon put him right, and he returned to work.

December, 1867.—He again fell ill with return of cough and shortness of breath ; this time I gave him the bicarbonate of soda, but he did not find this to relieve the chest, and remove the expectoration, so that I had to order the hypophosphite again, and he is amending gradually upon it.

CASE XII.—Joseph D., a thin, pale young man, with much cough, and frequent spitting of blood, which symptoms have troubled him about twelve months, came as a hospital patient on January 31, 1867.

Resonance of chest is fair, but expiration is prolonged under both clavicles, chiefly under right, and here a good deal of coarse mucous râle is heard. Pulse 114 ; tongue clean ; has lost 20 lbs. weight in six weeks.

R Calc. hypophos. gr. v.
 Liq. calc. sacc. ℥ss.
 Aq. Menth. pip ℥j. ℥ ter die.
 Pil. conii. co. om. nocte.

February 14.—Feels much better ; pulse 88 ; still some hæmoptysis. Pt. hst.

28th.—Some sonorous râle on right side ; still has cough, and at times hæmoptysis.

R Magnes. sulphat. ℥ss.
 Acid sulph. dil. ℥x.
 Infus. calumbæ. ℥j. ℥ ter die.

March 7th.—Worse ; pulse 100 ; increase of the hæmoptysis ; return to the hypophosphite. By the middle of April he was able to return to work, and has continued in very fair health up to present time, although the respiration in the right lung is not free from abnormal sounds. This man tried cod-liver oil, and also steel, but the only remedy that agreed well, and seemed really to check the progress of his disease, was the hypophosphite of lime.

CASE XIII.—Esther R., widow, æt. 39, seen March 21, 1867. Pale and thin, though living in a healthy suburb, and well cared for. Complains of much cough and expectoration, with, at times, hæmoptysis. The left side of the chest is dull, and full of crackling noises, the right is resonant, and the breathing strong.

Ordered sodæ bicarb. c. sodæ hypophos. for two weeks, at the end of which time there was not the least improvement.

R Acid. nitric. dilut. ℥ x.

Aq. camphor, ℥j. ℥ ter die.

On this mixture she amended considerably; she took it for a month with relief to her symptoms.

In May, after a short interval of rest from physic, the cough, expectoration, and exhaustion, seemed worse than ever, and we again made trial of the hypophosphite of soda. At this time, too, the catamenia had stopped, the cough caused her to vomit her food; the left chest was very tender, and full of moist crackling.

Curious to say, this time the hypophosphite answered well; the vomiting ceased; the respiration became more natural in the left lung, and in six weeks' time she was pronounced convalescent, having taken for the last fortnight some small doses of iron, but no cod-liver oil, as this did not agree with the stomach.

In July the catamenia returned naturally.

In October there was a return of the symptoms, and she had, for a time, carbonate of ammonia with infus. serpentariæ. On this medicine the disease evidently gained ground, but on returning to the hypophosphite of soda, the symptoms changed for the better in a way that elicited her very warmest praises, especially she noticed the breathing to get so much more free and easy while taking the hypophosphite with some ether in camphor water. The cracklings in the left lung were replaced, to some extent, by proper respiration, and for a time she continued in very fair health.*

In two other cases of men who had moist cracklings with the respiration at one apex, the breathing improved much under the use of the hypophosphite. One of these patients had been some few years before pronounced to be consumptive by Sir J. Simpson, and at that time found great benefit from inunction of oil to the chest. The arrest of the disease did not seem, however, to be so complete and lasting as it was under the influence of the hypophosphite of soda.

When one has, in the course of an afternoon, to see over one hundred patients, it is quite impossible, consistently with one's duty to each case, to take more than very scanty notes. I find, however, that I have put down a few notes of 158 cases treated chiefly with the hypophosphite of soda or lime. Of these, 100 were set down as "phthisis, 1st stage," which means that each presented some notable physical sign in the way of, dulness, jerking or uneven breathing,

* I regret to have heard lately, in answer to inquiry, of the death of this patient.

with prolonged expiration, and many of them had cracklings to a limited extent audible in one lung.

Of these 100 patients, 44 were very much relieved, and able to cease attendance and return to their employments; in the cases of 16,* hæmoptysis was specially noted. 47 others seemed to get some relief and benefit from the hypophosphite treatment; in 15 of these hæmoptysis was noted. In 9 cases, no benefit whatever resulted either from the hypophosphites or anything else. They were all cases of phthisis; 3 had hæmoptysis, and a noteworthy feature in all was great tendency to gastric irritation.

Of 58 cases where the disease was in the second or third stage, there were 8 that might be called real cures; 2 of these had decided vomicæ, and these were brought into a quiescent state. In the other 6 cases, very feeble breathing remained in both lungs. 23 others were set down as "much relieved;" 15 as "relieved;" 7 got no good whatever; and 5, to my certain knowledge, died. Such are the results which I find to come out, from going over the few notes I have been able to keep of these hospital out-patients.

The cases in which the hypophosphite of soda answers best as a remedy, appear to be those where there is no tendency to gastric irritation or diarrhœa, but where, perhaps, there may be imperfect action of the liver, preventing the patient from tolerating cod-liver oil, and, in these cases, it is as well to add ten grains of bicarbonate of soda to the five of hypophosphite, which I use as the ordinary dose. The physical signs that are best met by the hypophosphite, are those of slight congestion at the lung apex, with tubular breathing and humid clicking or crackling. Slight hæmoptysis does not, in my experience, interfere with the administration of the hypophosphite.

Where obvious dyspepsia or bronchitis from recent cold are prominent symptoms, they must be treated in the usual way, for at such a juncture the hypophosphite is not much use.

The hypophosphite of lime is good when there is profuse expectoration; also, it is of use when diarrhœa is troublesome, and may then be given with a small quantity of the liquor calcis sacc. of the British Pharmacopœia, in peppermint water, and sometimes in decoction of bark. As a general rule I find camphor or peppermint water by far the best vehicle for the hypophosphites, and I would strongly dissuade from any addition of bitters or sedatives to the mixture.

The hypophosphite of quinine is best given in pills, as prepared

* Hæmoptysis was only noted in those cases where it formed a prominent feature in the symptoms. In my own note-book far the majority of these 44 cases end as "discharged cured."

by Swann, of Paris. I have met with it as a bitter powder, becoming a gummy resin when warmed, but the pill is certainly the best form in which to administer this remedy.

Though generally I prescribe the powdered hypophosphite made into a mixture, with syrup and camphor or mint water, yet I have also used the ready-made syrups of the hypophosphites. Those prepared after Dr. Churchill's own formulæ, by Swann, of Paris, contain three grains of the salt in one fluid drachm of the syrup, and are excellent preparations.

For my own part I rarely exceed one drachm as the dose of these syrups three times a day, but some of my friends give them in larger doses. Dr. Mitchell, of New Cross, tells me that he has found most satisfactory results from one tablespoonful of Swann's syrup of the hypophosphite of lime in cases of most pronounced phthisis; the patients have not been able to be without the medicine, so marked has been the relief afforded by its use.

I cannot, from experience, say much about the syrup of the hypophosphite of iron, for I rarely use it, having the belief that it is a great stimulant to the circulation, and may, therefore, induce hæmoptysis. The syrup of the hypophosphite of quinine and iron, as prepared by Messrs. Savory and Moore, I have used often during the last three years, and have found it a most valuable remedy in cases of incipient phthisis without much excitement of the circulation. To judge from the reports of patients, its effect seems to be to remove chronic cough, and those flying pains in the chest, that are so significant of incipient consumption, also to restore the nerve force in a way that sometimes appears quite extraordinary.

In the first part of this book the reader will find a brief description of the hypophosphites, and their characteristics when pure. When well made the dry salts will keep in a closed bottle for many months, for I observe that some hypophosphite of soda, obtained from Warner's in Finsbury, two years ago, is now apparently as pure as when first bottled, and still retains the property of burning when warmed over a spirit lamp on the end of a spatula.

Dr. Churchill gives most ample directions, at page 660, for preparing the pure hypophosphites, commencing with the hypophosphite of lime, from which the other salts are prepared by double decomposition.

The hypophosphite of quinine, prepared by Churchill's process, is an amorphous powder the colour of honey, of the consistence of wax, deliquescent and very bitter; when warmed it burns like

a resin. This is the preparation made into pills by Swann; that which I have met with in English pharmacy has been, as already stated, a white amorphous powder.

My own experience entirely accords with that of Dr. Churchill as to the great utility of the hypophosphite of quinine in the early stages of phthisis, and, I think, with some satisfaction, of the case of a young medical man, who is now strong, healthy, and active, while three years ago he had cough, wasting, hæmoptysis and all the signs of phthisis commencing in the upper part of one lung. The only remedy I prescribed in this case was the hypophosphite of quinine.

In testing the powers of such remedies as the hypophosphites in consumption, it is well to take every legitimate opportunity of withholding other medications during the trial. Not infrequently we are compelled to do this from the patient not being able to take cod-liver oil, and being nauseated by most of the mixtures that are usually given to consumptive people. It is in these cases that I have noticed very good results to follow from the administration of the hypophosphite, the disease appearing to be arrested in its progress, although the mischief it has done may remain, and be very evident in a physical examination of the chest.

These cases of progressive phthisis thus checked solely by one remedy, are interesting and instructive, but in actual practice I would always urge the use of cod-liver oil with the hypophosphite. Phosphorus and fat ought to go well together, and ought to be, in conjunction, great regenerators of nerve force and tissue. Hence, on the theory that the essence of pulmonary consumption lies not in the lungs, nor yet in the stomach, but in the nerves that govern the nutrition and metamorphosis of tissue throughout the body, I believe that we cannot give any two medicines more eminently well-adapted, according to the teachings of physiology and chemistry, to restore nerve force than phosphorus, and an easily assimilated fat, like cod-liver oil.

Phosphorus itself is not easily tolerated as an internal remedy, its solution in oil causing nausea and heat at the stomach. Lately, I find Dr. Radcliffe has been recommending a pill made by melting phosphorus with prepared suet in a closed vessel, and then coating the pill with gelatine; the amount of phosphorus in each three grain pill is 1-30th of a grain.* One of these pills three times in the day, followed by a dose of cod-liver oil, would be an admirable way of introducing a phosphorized fat into the system, but I cannot, from any experience of my own, speak as to the superiority of the phosphorus pill to the powder or syrup of the hypophosphite.

* See "Squire's Companion to British Pharmacopœia." 5th Edition, p. 182.

It may here be very properly asked, what reason is there to believe that a deficiency of phosphorus in the animal economy is at the root of tubercular disease?

For my own part I would say, in answer to this question, that ever since I paid attention to the pathology of commencing phthisis, I became impressed with the belief that the real essence of the disease must lie in the nervous system; I mean in that part of it which governs such processes of organic life, as assimilation and tissue formation, as well as the metamorphosis and excretion of the products of used-up and effete tissue from the system.

To treat the local pulmonary symptoms of consumption by sedatives and cough medicines, has been proved often enough to be quite useless, so far as any real cure of the complaint goes.

To treat the general health, and to improve the state of the digestive organs, in many cases succeeds well; especially in the instance of phthisis from acquired causes, such as poor living and so forth, and it is surprising to find, among the poor who come for advice at the hospital, how much good can be done by a general tonic plan of treatment.

There yet, however, remains the large class of those who are affected, from no known cause, with genuine, often hereditary, tubercular phthisis; these patients, who are found more in the upper than in the lower classes of the community, although they obtain every possible advantage in the way of general and medicinal treatment, are nevertheless carried off, despite all efforts, in two, three, or at most, in a very few years.

This class of case forms the true type of hereditary tubercular consumption, and here it is that I believe the nervous system to be chiefly at fault, so that nutrient matters are not properly assimilated and deposited as healthy tissue on the one hand, or on the other the products of tissue waste are not perfectly converted into such bodies as can be excreted from the system by its various emunctories, hence it is that the urea is often deficient in the urine of the phthisical (Becquerel.)

In either case the blood becomes loaded with matters useless for nutrition, and yet not capable of ready excretion, and this effete matter forms by its deposition, or precipitation, from the blood in the lungs, the elements of pulmonary tubercle.

Whatever this theory may be worth, the fact is to me certain, that it is exactly in these cases of hereditary consumption where the curative effects of the hypophosphites are often most marked and satisfactory, and that, too, when rational hygienic measures and good remedies have been tried to small purpose for some time previously.

Since it is well-known that phosphorus, in the form of a phosphorized fat, is an essential constituent of healthy nerve tissue, we may hope by giving phosphorus in a form easily assimilated to invigorate and restore any portion of the nervous system which may be failing in its nutrition and functions from a lack of this essential constituent.

To prove by chemical analysis that a deficiency of unoxydized phosphorus in the system is the cause of tubercular disease is most difficult, as in the processes of the analysis the phosphorus is almost certain to be raised to its highest degree of oxidation, and so to come under our notice in the shape of a phosphate.

The detection of the phosphates is easy enough, but as these are stable compounds in which the phosphorus is fully oxydized, it is in the highest degree improbable that they should ever form a medium for the introduction of the element phosphorus into the system in an unoxydized condition; and, therefore, although these phosphates may be good medicines to administer when phosphates are wanted, as such, to strengthen bones weak from want of phosphate of lime, yet they are quite useless for any purpose of increasing the phosphorized matters that are wanted to regenerate the nerve structures.

Although the detection of unoxydized phosphorus in the system is difficult, yet many chemists, as Hensing, Vauquelin, Fremy, and Von Bibra, have agreed as to the presence of phosphorus in the fatty matters of the brain and nerves,* 1.68 per 100 being the mean quantity of phosphorus in the human brain. In 1848, Dr. Owen Rees, writing in the "Philosophical Magazine" (No. 219) put forth the theory that phosphorus exists in combination with a fatty matter and hematosine in the corpuscles of the venous blood, and that this phosphorus, when it reaches the lungs, is oxydized into phosphoric acid (PO_5), which, by combining with the soda contained in the blood serum, produces that change to a bright scarlet, which characterizes the arterial blood.

The presence of phosphorus in the albumenoid bodies has been proved by Mulder; and Carpenter, in his principles of physiology, believes that the phosphates of the economy are produced by the oxydation of the phosphorus which exists in these albumenoid bodies. It seems to me possible that a too rapid oxydation and exhaustion of this phosphorus might leave the albumenoid matter so changed in composition as to be no longer fit for assimilation into tissue, but just brought into that state in which it might readily form tubercular matter.

In such a case of excessive oxydation of the phosphorus, we should

* Lehmann. Append. to vol. iii., p. 557.

look for an excess of phosphates in the blood, and in the urine; and, according to Becquerel and Rodier, phosphate of lime is present in increased quantity in the blood of phthisis. It is also affirmed by Beneke, that in all cases of tuberculosis, with emaciation, the earthy phosphates in the urine are increased.

Again, according to the theory of Dr. Owen Rees, which has just been stated, this rapid and extensive oxydation of phosphorus would have the effect of diminishing the venosity, and increasing the arterialization of the blood.

In phthisis it is generally believed that the arterialization of the blood is high, and some have maintained that certain disorders, like asthma, emphysema, and cyanosis, where the venous state of blood predominates, are antagonistic to the development of pulmonary consumption. This theory is not, however, entirely supported by facts, for it is by no means uncommon to find emphysema and tubercle co-existing in the same patient.

The high arterialization of the blood in phthisis is a point noted by many experienced men, as, for instance, Sydenham, Boerhaave, and others (see Ancell on Tuberculosis), and the way in which I have explained it to myself is on the theory above stated, which rests on the explanation of the arterialization of the blood given by Dr. Rees. Dr. Churchill, at pages 747-8, lays much stress on this high arterialization of the blood in tuberculosis, and claims for the hypophosphites the power of inducing a more venous condition of the circulating fluid. I shall advert to this point again shortly, when speaking of the practical application of the hypophosphites.

The object of this work being thoroughly practical, I will not dwell longer on these theoretical points. Enough has been said to show that there is certainly something to be said as to deficiency of oxydisable of phosphorus (*phosphology* Dr. Churchill terms this want of phosphorus) being a highly probable cause of tuberculosis. My own belief is, that the phosphorus is consumed by a too rapid oxydation in the lungs, and so converted into phosphoric acid before it has supplied the nerve tissue with the unoxydized phosphorus which it requires for its nutrition and growth, hence results failure of nervous force as one factor of the phthisical state.

Further, I conceive it possible that this rapid oxydation of the phosphorus of the albumenoid matters of nutrition may disintegrate these bodies in an irregular way, and cause their elements to collect in the blood in such form as to be unfit for tissue structure, and only fit for deposit as tubercle. I put forward these ideas as endeavours to elucidate the unquestionably beneficial action of the hypophosphites in tubercular phthisis. Some day

perhaps, we may have the fact of deficiency of unoxysed phosphorus in the system of the consumptive proved in the same way in which the deficiency of a quinine-like body in the system is reported to have been proved by recent observers in cases of ague.*

We may remember that in the case of ague, and malarial fever, our treatment had become very certain and successful long before we had the least idea as to the explanation of our success, and this may encourage us to persevere in observing the effects of remedies even though we cannot, with our present means of knowledge, exactly explain their true "methodus medendi."

ON THE PRACTICAL ADMINISTRATION OF THE VARIOUS HYPOPHOSPHITES.

The objections to phosphorus itself, as an internal remedy, have been already alluded to.

The phosphorized oil has been tried by many physicians; Dr. Williams used it many years ago at University College Hospital, and the late Dr. Theophilus Thompson tried it also in the Brompton Hospital, but with no very striking results, as far as curing consumption was concerned.

The dose given by Thompson seems to have been less than a grain per day, and this Dr. Churchill believes to be too small a quantity to be of any curative value (702).

When given in solution in oil the phosphorus is oxydized in the system, and large quantities of feathery crystals of phosphate appear in the urine, which disappear when the use of the drug is withheld.†

The oil, in large dose (gtt. x. of a solution of 4 gr. of phosphorus in ℥j. of olive oil) is very nauseous to the stomach, gives a "lucifer match like" smell to the breath; and, if persisted in, causes jaundice, and sometimes serious hepatic derangement; it is, therefore, a troublesome and unsatisfactory medicine, and I have quite ceased to use it in practice for some years.

The hypophosphoric, phosphorus, and hypophosphorus acids, have all been used by some few observers in medicine at different times, but with no marked effects, and they need not concern us further; we pass to the combinations of the last-named acid, the hypophosphites.

Dr. Churchill was the first to introduce the hypophosphites into actual practice, but he himself tells us (page 707) that there is a formula for the hypophosphite of potash found in the "*Pharmacopée usuelle de Van Mons*," published at Louvain in 1821. Nothing is

* Dr. Bence Jones' Third Croonian Lecture, 1868.

† "*Bennett's Principles of Medicine*," 3rd Edition, p. 416. Phosphorized oil tried in paralysis with no result. Recently Delpech, of Paris, has spoken very highly of phosphorus in paralytic diseases.

said of the properties or dose of this preparation, and it is doubtful if it was ever administered.

The hypophosphite of potash has been described in the early part of this book. As a remedy, I do not often employ it; it must be used with very great caution, being a powerful solvent of condensed and consolidated lung tissue, and if tubercles are present, it may cause these to soften with a rapidity that may be dangerous and alarming.

In some few instances of consolidation of lung from exudation, I have used this hypophosphite with great success, as will be seen by looking over the two following cases:—

CASE I.—Susan N., living in a marshy part of Kent, aged 35, seen January 28, 1867.

About two months ago she was laid up with bronchitis; the acute attack yielded to treatment, but there remains now a troublesome cough, with a thick, very foetid, expectoration, and great tightness and oppression at the chest.

The voice has become so feeble as to be scarce heard. She rests pretty well at night; tongue coated slightly, with a furrow down its centre.

Respiration very harsh—at left lung apex it is tubular.

Ordered—Hypophosphite of potash, gr. v. ex., aq. camph., t. d.

July 4th.—Very much better. Continue medicine.

18th.—Been without the medicine for a week, and during that time the cough returned with nasty fetid expectoration, not so while taking the medicine. Resume mixture as before.

By the end of March she was put upon a tonic mixture, and dismissed cured.

CASE II.—Another case was that of a gentleman, who I attended twelve months ago, with Dr. Lawrence, of Wandsworth, for a severe attack of left pleuro-pneumonia. The consolidation of lung was very obstinate, but at last resolved itself in a most satisfactory way, under the influence of three gr. of hypophosphite of potash, taken three times a day for some weeks.

In this case the medicine at first caused some increase of cough and expectoration; this is, in my experience, a very usual occurrence, and, provided this augmentation of the expectoration does not cause undue exhaustion, it need not cause anxiety.

Allusion has already been made to the cases in which the hypophosphite of soda is serviceable. They are those in which there is good reason to believe in the commencement of tubercular disease, with some expectoration, and perhaps slight attacks of hæmoptysis.

The digestive organs should be in pretty good order, otherwise

this hypophosphite is apt to disagree, causing heat and oppression at the stomach, flatulence, and pyrosis.

Should the stomach seem very intolerant of the hypophosphite of soda, then the lime-salt may be used in exchange. The hypophosphite of lime tends to check diarrhœa and excessive sweating, it also arrests expectoration, and if given in too large a dose a very uncomfortable feeling of dryness and tightness of the chest is induced. The syrup appears to me to be the best form in which to give the hypophosphite of lime.

The hypophosphite of iron I never use, save in the form of the syrup of the hypophosphite of iron and quinine already mentioned, and this is an admirable remedy in the nervous and general debility which ushers in early phthisis. In cases threatened with hæmoptysis the remedy is best avoided.

The hypophosphite of quinine suits best in those cases where we want a tonic, but do not think it advisable to have recourse to iron; in early phthisis the pills of the hypophosphite of quinine are most valuable, as has been already stated.

Of the hypophosphites of manganese, alumina, and ammonia, I have no experience to offer.

It must always be recollected in the practical use of the hypophosphites that their sphere of action is to check the gradual invasion of the system by deposits of tubercle, and it is in the gradual development of phthisis in young, growing people, coming of consumptive ancestors, where their remedial powers are most marked and most certain. This is a point on which my own experience enables me strongly to agree with Dr. Churchill.

I may here remind my readers that these are the very cases in which something approaching as nearly as possible to a specific remedy is so much wanted. The only remedy as yet in our possession on which any kind of dependance can be placed is cod-liver oil. Iron, certainly curative if true anæmia has to be treated, is not only valueless, but, I believe, often most injurious in many of these cases of tuberculosis. Quinine and the mineral acids are worth something as general tonics, but of their anti-tuberculising powers I have yet to be convinced.

It is, therefore, for the purpose of arresting the deposition of tubercle, and of eradicating the tubercular diathesis, that we are to have recourse to the hypophosphites; hence, to insure anything like success, we must be careful and exact in our diagnosis, for it will be found quite useless to give these medicines with a view to curing any of the numerous complications of phthisis.

For example, the system of a patient with advanced phthisis may

be in a state of fever and irritation from imperfect oxydation and elimination of effete matters retained in the blood. The action of the liver may be imperfect, with pale and scanty evacuations, and the urine turbid with lithates; with these symptoms there may also be heavy sweatings at night, with dyspnœa, cough, and much expectoration.

To give any of the hypophosphites in such a state of the system is pretty certain to lead to disappointment; equally unsatisfactory, probably, will be any attempt at treatment by cod-liver oil and tonics; while a course of citrate of potash in carbonic acid water, and a few weeks of milk diet, will often work a marvellous change for the better. The secretions become free, the sweatings cease, and the rest at night becomes tranquil and refreshing.

Not unfrequently I have, in this description of case, given small doses of mercury, intending its eliminative action, with the happiest effect, and have found patients speak of the mixture, containing— \mathfrak{M} xxx. of liq. hydrarg. bichlor. to the dose, as being "so very strengthening."

At page 504 of Dr. Fuller's "Treatise on Diseases of the Lungs" is a very striking illustration of the curative effect of this eliminative and alterative plan of treatment in a case presenting cavities in both lungs. The cavities healed completely, and the patient was seen in perfect health five months after he was discharged from St. George's Hospital.

Now, in this case the hypophosphites would probably have been quite as useless as the tonics and cod-liver oil which Dr. Fuller gave his patient in the first instance. The reason being that these remedies were in no way required; the probability was that the tuberculizing tendency in the system had, for some reason or other, ceased, and all that was required was an elimination from the blood, by the secretions, of the effete matters which were oppressing it, and preventing the spontaneous cure which nature was quite ready to commence.

Very often I have seen active consumption in its third stage arrested by means of the hypophosphite of lime; cavities existing in the lungs becoming quiescent for months, or even years, and the general health improving greatly. A phenomenon often noticed and often referred to in these cases by the patients is their great breathlessness; they feel well, they say, "but for the breath." This harassing dyspnœa I have now recognised as one of the phenomena of phthisical convalescence when the destruction of lung tissue has been extensive. Dr. Churchill has referred to the same point, and has had patients, in whom advanced phthisis had been arrested, come again to consult him solely on account of the distressing dyspnœa.

As under the influence of general tonics the blood improves in quantity and quality, the dyspnœa may become even more marked than it was when the nutrition of the system was in a lower and weaker state.

Since our attention is now resting on the treatment of advanced phthisis, I would here draw to a matter of no small importance when observing a case with quiescent cavities in the lungs. It is this—not to mistake inflammatory action set up by cold, or any other exciting cause, in the wall of the cavity for an extension of the tuberculizing action in the lung, demanding renewed administration of the hypophosphites.

If this mistake be made, it will be found that the hypophosphite mixture will be of no more value than an equal quantity of salt and water administered to the patient.

The proper treatment for this complication will be to allay the inflammatory action, and to apply counter-irritation to the chest-wall in the vicinity of the inflamed cavity.

So again, when there is inflammatory action going on round a deposit of tubercle, with fever of the system, a short course of salines, with perhaps some tartarized antimony, will answer better as a curative means than any of the hypophosphites.

These hints will guide the practitioner, and cause due attention to be paid to making an accurate diagnosis, not only by local signs, but by regarding, also, the general pathology of each individual case that comes under notice.

A few words now on the complications of phthisis, and the extent to which they interfere with, and influence the curative action of the hypophosphites.

Hæmoptysis.—A slight amount of spitting of blood need not oblige us to suspend the action of the hypophosphite, if in other respects its effect seems good. If, however, the hæmoptysis persists, or seems to increase, then it is safest at once to stop the hypophosphite treatment. Dr. Churchill points to epistaxis (p. 611) as an indication that the system is saturated with the hypophosphite, and that it is time to stop its action. I have, in a few instances, had patients complain, for the first time, of epistaxis after they have taken the hypophosphite of soda for some time, and when they do so it is wise to suspend the action of the medicine.

Diarrhœa.—Over the diarrhœa of advanced phthisis, due to ulceration of the intestines, none of the hypophosphites that I have ever tried have had any curative action. I do sometimes in these cases give the hypophosphite of lime, with bark, with some good effect. Here, however, I believe the benefit is due more to the bark

than to the hypophosphite. I believe the hypophosphite of alumina is recommended in these cases, but I should doubt its being superior to any of the more commonly-used astringents.

In the diarrhœa met with in the early stages of consumption, and at that time a very serious symptom, the hypophosphite of lime is certainly of decided service.

Vomiting.—Where the stomach is irritable, and vomiting a troublesome symptom, the hypophosphite of lime will often act beneficially, while the soda-salt does but aggravate the gastric irritation, and cause, also, troublesome flatulence in the bowels.

Sweating and Excessive Expectoratation.—In these complications the hypophosphite of lime is preferable to the soda-salt, but it will often be found that the dilute sulphuric, phosphoric, or acetic acids, are better than any form of hypophosphite.

Amenorrhœa.—Often suppressed menstruation returns in a satisfactory way while the patients are taking the hypophosphite of soda.

Dr. Churchill (p. 614) says that in eight cases of amenorrhœa the menses returned in six.

In the male, sexual debility and spermatorrhœa are influenced beneficially by the hypophosphites, but not to the extent I should myself have expected from what is said of the action of phosphorus itself on the sexual functions.

Laryngeal Symptoms.—In cases of that very intractable disease, laryngeal phthisis, I must confess I have not found satisfactory curative effects from the use of the hypophosphites. Some four years ago, I had a young lady under my care with cough, hæmoptysis, and signs of incipient phthisis at the left apex. Under the use of the hypophosphite of soda, every morbid sign vanished in about two months, and she has since remained in good health. Her sister, on the contrary, has now every sign of progressive laryngeal phthisis, with complete extinction of the voice, cough, and wasting; and no form of the hypophosphite, or indeed of anything else that has been tried, has done her any good. In the winter of 1866 the symptoms were not advanced, and an examination with the laryngoscope, did not show any ulceration of the larynx. She went, by my advice, to Bournemouth; while there her voice returned, and she came back very much better. The improvement only lasted during the summer; with the cold weather the laryngeal symptoms returned in an aggravated form, and she has been obliged to take refuge on the coast of South Devon.

From what I gather in perusing the reports of cases of laryngeal phthisis, treated by Dr. Churchill, it seems that the aid of various

other methods of treatment, local and general, has here to be invoked in addition to the use of the hypophosphites.

This is not to be wondered at; for when once ulceration has established itself in the larynx the ulcer must be treated on general principles, by counter-irritation to the throat, various internal applications of medicated solutions, and, above all, by placing the patient in a steady and mild climate, such as that which is obtained at Ventnor, Bournemouth, or Torquay. If a foreign residence be tried, Pisa or Madeira, will probably best suit the requirements of the case. Patients, with very irritable larynx, do not seem to bear a bracing air so well as they do one which is mild and warm.*

These remarks on the complications of phthisis will guide to forming a prognosis as to the amount of good likely to be done in any given case by the hypophosphites. From practical experience, I am able to say that the age of the patient is of importance in determining the favourable nature of the prognosis, to be given in any case. It seems the younger the patient the more favourable is the prospect of a real cure. I am aware that we are all liable to errors of diagnosis in the chest affections of very young children, and also that often nature will come in and work a cure, when the doctor has given the case up as hopeless; still, it is not only in the instances of those who are quite children, but also among those who are growing, and in their "teens," that the hypophosphites act with a curative energy much more marked than in the instances of those more advanced in life. Here I find that my experience accords with that of Dr. Churchill.

I find that Dr. Churchill lays great stress on the establishment, by degrees of a state of venous plethora in the system, as a sign that the full effect of the hypophosphite has been attained. If the administration of the drug be still persisted in, signs of disturbed innervation occur such as vertigo, headache, dyspepsia, noises in the ears, with more or less fever and excitement of the system, a state of things highly dangerous for one who has phthisis, with tendency to blood-spitting.

A tendency to a florid fulness of the face and to epistaxis, are given by Churchill as the earliest signs of the system being saturated by the hypophosphite. This fulness and florid hue in the face is not always evident in those who are of a bilious or nervous temperament, but whenever it is observed, it is a sign that we should, for a while, pause in the use of the hypophosphite.

In some few instances I have noticed this fulness of the face, and

* See p. 30 of the author's notes on "Change of Air in the Treatment of Phthisis Pulmonalis." 2nd Edition.

also, in a few instances, I have had patients draw my attention to epistaxis, a complaint quite unknown to them before they had commenced taking the hypophosphite. Churchill notices, at p. 611, that of fifteen patients who had epistaxis once or twice while taking the hypophosphites, only one had ever been thus affected before.

So far as my observation goes, neither fulness of face nor bleeding at the nose are by any means common or constant effects of the hypophosphites, but as patients do now and then mention one or other of these symptoms, it is well to be aware that they are to be expected at times, and may have some significance. In several instances patients have complained to me of dyspepsia, flatulence, pyrosis, and restlessness at night—while they have been taking the hypophosphites. I have not been able to overcome these difficulties in a satisfactory way by any conjunction of bitters or alcalies with the hypophosphite, and have come to the conclusion that if any one of the hypophosphites is really to do good, it will do so best given in water, with perhaps some syrup added thereto, and if when thus given it causes disturbance of system and dyspeptic symptoms, then we must change to some other hypophosphite, and if we get no better success must lay aside the medicine for a time altogether.

PERMANENCE OF THE CURATIVE EFFECTS OF THE HYPOPHOSPHITES.

Time only will enable us to get reliable information on this deeply interesting question. From what I have seen of patients whom I have treated three or four years ago by means of the hypophosphites the permanency of the cures has, in numerous instances, been so remarkable, that I have doubted as to whether I correctly noted the symptoms manifested by the patient, when actually under treatment, and have questioned them as to their own recollection of their past symptoms.

Dr. Churchill, at p. 627, states that amongst those whom he had cured, and especially among those in whose cases the disease had been arrested in its third stage, nearly all who remained in Paris under his immediate observation, had continued to enjoy good health, although liable to suffer from catarrhal affections upon any great and marked change in the weather.

This great susceptibility to any change in the weather is acutely felt by those who have old and quiescent cavities in the lungs, and, as has been already stated, care must be taken not to mistake passing inflammatory action set up by cold or damp in the walls of one of these old cavities, for a fresh invasion of tubercular disease.

Also, when one lung is rendered almost useless, in consequence of its being occupied by a quiescent cavity, the sound lung must be

watched, for this will at times suffer, as it were, from overwork, and we may get signs of bronchitis, or broncho-pneumonia, appearing at the base of the sound lung, while the other may be much diseased in its upper part, a complication likely to be a very serious one.

It appears on the whole that when once the curative action of the hypophosphite is attained in a case of tubercular phthisis, the probability is that the arrest of the disease will be permanent, although the patient will be liable to catarrh and attacks of bronchitis or pneumonia, if he be not exceedingly careful in his manner of living.

At times it will be well to resume the use of the hypophosphite as a prophylactic, and in the case of young people who are growing rapidly, it is very necessary to attend to this precautionary measure.

The dose may vary from one to five grains three times a day, dissolved in water, with or without the addition of syrup.

CASES OF FAILURE IN THE HYPOPHOSPHITE TREATMENT.

This work would be very incomplete if it said nothing of unsuccessful cases, and I am sorry to say there are some cases of phthisis which have come under the author's notice, where no one of the hypophosphites was of the least curative value; in many instances the reason of the failure was plain enough, it was iron and not phosphorus that was wanted by the economy, for the patients were anæmic, and hence made no progress till they got the right medicine.

In other cases there have been present signs of advancing tuberculosis, with much gastric irritability, and the disease has proceeded in no way influenced by any hypophosphite that might be given.

I have, in some of these cases, and in a few cases of laryngeal phthisis, when I had vainly tried to do good by the hypophosphites, given the bisulphide of carbon, in doses of one drop, three times a day, thinking possibly it might be sulphur rather than phosphorus that was wanted in the system. For some people the smell of this bisulphide of carbon was enough to prevent their continuing it; others thought it gave relief to the difficulty in breathing, but, on the whole, it did not, so far as I tried it, prove a medicine of much utility, either in laryngeal or pulmonary phthisis. The great and interesting progress that is now making in our knowledge of the varieties of pulmonary phthisis, shows the direction in which we must look for light to help us in these cases which at present seem determined to assert the incurable nature of the complaint.

Dr. Churchill publishes a series of cases (page 418) where death took place during the course of treatment. They appear to have been cases of rather advanced disease, in many instances noted as

non-hereditary, and some of them were complicated with laryngitis and troublesome diarrhœa.

This series extends from case 92 to 107—16 cases.

Enough has, I trust, now been said to show the claim that these hypophosphite salts have upon our notice as remedial agents in tubercular phthisis. It is in the medicinal treatment of consumption that we are at present sadly at fault, and yet, notwithstanding, an author who contributes something to the morbid anatomy of this disease, is usually regarded with more favour than one who ventures to think he can add something useful to its therapeutics.

I observe in the *Medical Times and Gazette* for March 14, 1868, the statement that in the Parisian Hospitals the deaths from phthisis alone surpass in number those from all other diseases united, and taking the mean mortality of Paris at 50,000, there are about 8000 deaths from phthisis, or about a-sixth of the whole. Meantime, a debate, now prolonged over several weeks, is still going on at the Academy of Medicine, upon the pathology and communicability of tubercle.

We must live in hope that as our knowledge of the pathology of phthisis increases, so too will increase our knowledge of the application of remedies. I have seen enough myself to be convinced that it is of no use at all to try and treat all cases of phthisis by means of the hypophosphites, for while there are many cases in which they appear specifically curative, there are others in which they are useless. This uncertainty of action, however, ought not to be referred to the drug, but rather to the diagnosis of the actual pathological state of the patient. We know how common it is to hear a medicine spoken of as "uncertain," whereas, I believe, it is often our diagnosis of the actual morbid condition that is uncertain, and not the action of the medicine on given morbid phenomena.

While an advancing and enlightened pathology tends to put aside what are called "specifics," for the infallible cure of a disease so soon as it is named, it ought, nevertheless, to guide us to a greater precision and certainty in selecting the medicine best adapted to relieve the morbid symptoms that are immediately before our notice.

By the same Author.

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