

CHEMICALLY PURE HYPOPHOSPHITES.

PREFACE.

THERAPEUTICAL INDICATIONS

WITH

CLINICAL DATA.

EDITED BY

R. W. GARDNER, Pharmaceutical Chemist,

TWELFTH EDITION.

158 WILLIAM STREET,
NEW YORK.

1895.

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LEWIS & CLARK

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NEW YORK

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PREFACE.

There seems to have been such a lamentable omission of scientific research and investigation of the therapeutic action of the Hypophosphites; the physiological effects of graded doses; the indications for the different salts, when administered singly; so much disregard to the antagonistic and complicating, as well as the toxic results from combinations; and so little written and taught in the colleges, and in the text-books upon the clinical investigations of Churchill, that a necessity exists for more *scientific* and *definite* methods.

Attention is called to the standing and eminence of the contributors to the medical literature contained herein. It will also be observed that the most influential of the medical journals of the country have been the medium through which these papers have been made known.

Chemically pure salts, of neutral reaction, and greatly improved therapeutic value.

In definite proportion, prepared only with distilled water, and chemically pure sugar, to protect against atmospheric oxidation.

Put up only in sixteen and eight fluid ounce bottles to meet the requirements of physicians' prescriptions. Each cork covered by a strip label, bearing fac-simile signature of the manufacturer, and attached to the cork by monogram seal (R. W. G.) in wax, uniting strip label to the bottle in such a manner that it cannot be removed without destroying the integrity of the package. The fac-simile of the signature of R. W. Gardner is also upon the label of each bottle.

The elixirs of the Hypophosphite Salts are put up in the same manner but are not so reliable for therapeutic effect as the syrups. The amount of sugar is not so great, and the protection against oxidation not so complete. They were prepared, with a view to their use in cases where the sugar cloyed the stomach; but the syrups may be administered in milk, coffee, lemonade, and in such a variety of ways to overcome this difficulty, that probably no case will occur where they may not be used.

The Hypophosphite of Quinine is prepared only as an elixir, as the vehicle is a better solvent for the salt and renders the preparation more palatable.

The Clinical Index which has been prepared with great care will be found valuable for quick reference. The diseases have been alphabetically arranged in order to facilitate study and research.

The therapeutic notes, made editorially, have been also carefully prepared, and are the outcome of considerable thought.

It is hoped that this matter may be of service, in indicating, or assisting to do so, the varied useful and valuable applications of these remedies.

They have been arranged under the various pathologic headings, and frequently accompanied by an analysis of their therapeutic action. They are offered in the hope that they may prove serviceable in pointing to special indications for these preparations. For much of the information, the writer is indebted to the experience of the many eminent writers who have contributed valuable papers, and he has also ventured to enlarge upon the subject as a result of his own thought and observation.

Every article in these pages by American authors, has been written with particular reference to, and after special observation of the action of *Gardner's Preparations*.

They all refer to these preparations exclusively, and not imitations of them.

The value of the Hypophosphites as therapeutic agents, and more particularly the *great advantage of discriminating methods* in their application, and the use of chemically pure salts, applied singly according to indications, ought to prompt to more careful observation and more frequent and painstaking reports of cases treated, for the benefit of medical science and humanity.

The subscriber trusts that his labor in completing this matter, and the suggestions he has been enabled to contribute, will be received in the same generous and courteous spirit which has always characterized his intercourse with the profession, during the many years he has endeavored to serve them.

He cannot close without again expressing his deep sense of obligation, to them for their kind appreciation and support.

Respectfully,

R. W. GARDNER.

HYPOPHOSPHITES.

CLINICAL INDEX.

	Page.		Page.
Anæmia.....	77-91	Nervous Insufficiency.....	105
Aphthæ.....	57	Neurasthenia.....	77-105-109
Apex Catarrh.....	80	Osseous and Nervous Systems, Mal-	
Bone Development in Children.....	106	nutrition in.....	106
Bony and Periosteal Tissues, Sub-		Phosphorus, Availability of the Ele-	
acute and Chronic Inflammation in.....	106	ment and Its Compounds,	24 to 55
Bronchitis, Chronic.....	78	Phosphorus the Most Combustible	
Chlorosis.....	91	Element in the Organism.....	74
Delicate and Weakly Children.....	112	Phthisis Pulmonalis, History of Cases	
Dentition, Difficult or Retarded.....	77	Treated by Churchill's Method.	92-95-
Development, Imperfect, Incomplete,	99-100-102-103-104-113-117	
or Retarded.....	77	Phthisis, Clinical Notes.	
Dysmenorrhœa.....	91	Appetite and Digestion Considered 40-	
Free Phosphorus, Changed to Hypo-	50-60	
phosphite Before Absorption.....	32	Arsenic.....	46
Grippe, La.....	111	Alcoholic Drinks.....	46
Hip Joint and Pott's Disease, to Avert.....	107	Amenorrhœa.....	59-61
Hypophosphites versus Phosphates.....	34-43	Acute Phthisis.....	64
Hypophosphites, General Action of.	39	Apparent Aggravation Under Treat-	
Hypophosphites in Other Diseases		ment.....	66
Than Phthisis.....	77	Accidental Inflammation Mistaken for	
Hæmatisis, Diseases of.....	77	New Tubercle Deposit.....	68
Indications of Iron, Hypophosphite		Arrest of Tubercular Deposit by Hy-	
of.....	55	phosphites.....	46
Indications of Lime, Hypophosphite		Bacillus, The.....	37
of.....	31-54	Blood, The Effect of Hypophosphites	
Indications of Manganese, Hypo-		on.....	51-72
phosphite of.....	55	Calorification.....	73
Indications of Quinia, Hypophosphite		Classification by Stages.....	49
of.....	54-92	Cod Liver Oil.....	46
Indications of Potassium, Hypophos-		Colliquative Diarrhœa.....	61
phite of.....	77-78-91	Complications.....	56
Indications of Soda, Hypophosphite		Combinations of Hypophosphites,	
of.....	31-54	Danger of.....	42-48
Intra-organic Oxidation a Necessity to		Conclusions, Therapeutical, Churchill's	69
the Tissues.....	11	Condition of Results by Hypophos-	
Myelitis, Chronic.....	77	phites.....	63

	Page.		Page.
Contra-indications	46-47	in Phthisis.....	47
Contra-indicated Hypophosphites... 47		Precautions.....	39 to 43
Cough.....	60	Prophylactic Doses.....	49-68
Cure, Condition of.....	63	Prognosis.....	56
Cure, Permanency of.....	48	Purity of Hypophosphites, Necessity for.....	52
Danger from Ill-considered Combina- tions.....	42	Physiogenic Effects of the Hypophos- phites.....	35
Diet.....	52	Pathogenic Effects of the Hypophos- phites.....	35-51
Diarrhoea.....	61	Pyrogallic Acid in Hæmoptysis.....	57
Dyspnoea.....	60	Quinia, Hypophosphite, Indications of.....	54-92
Epistaxis.....	52	Relapse.....	67
Expectoration.....	60	Rapid Softening.....	40
Failure, Cause of.....	44	Shortness of Breath.....	48
Fever.....	58-60	Sleeplessness.....	60
First Signs of Improvement.....	41	Soda, Hypophosphite, Indications of	31-54
Hæmatosis.....	50	Summary of Argument on Theory of Tuberculosis.....	75
Hæmoptysis.....	52-57	Summary of Churchill's Methods in Phthisis.....	27
Hæmorrhage.....	41	Stethoscopic Signs, Misunderstood... 68	
Heredity.....	47-48	Strength.....	61
Hypophosphites, Best Time to Ad- minister.....	42	Theory of Tuberculosis, Churchill's, Extracts from.....	72
Hypophosphites, General Action of... 39		Therapeutic Effects in 79 Cases, by Churchill, tabulated.....	60
Iron.....	46-52	Urine.....	73
Iron, Indications of.....	55	Venous Plethora.....	50
Intestinal Congestion, or Hæmorrhage by Overdosing.....	52	Vomiting.....	58
Laryngitis.....	59	What Not to Prescribe.....	45
Lesions, Graduated Scale of.....	50	Pleural Deposit.....	79
Lime, Indications of.....	31-54	Pregnancy.....	77
Manganese, Hypophosphite, Indica- tions of.....	55	Reconstructive Action of the Hypo- phosphites.....	109
Menstruation.....	61	Richitis.....	77
Metallic Salts.....	46	Scrofula.....	74
Modification of Symptoms Under Treatment.....	61	Sub-acute and Chronic Inflammation in Bony and Periosteal Tissues... 106	
Narcotics.....	42	Uterine Catarrh.....	78
Necessity of Accurate Auscultation.. 64		Want of Co-ordination from Specific Tumor of Brain.....	108
Nervous Energy.....	50		
Night Sweats.....	58-60		
Oedema.....	57		
Opiates.....	42		
Overdosing.....	41		
Phthisis, Early Treatment of.....	78		
Potassium and Ammonium, Danger of			

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INTRA-ORGANIC OXIDATION

A NECESSITY TO THE TISSUES.

It is well known that the human body is an oxidizing apparatus; all substances entering the organism, with rare if any exceptions, are, if such a change is possible, oxidized to their utmost extent before being eliminated; that the breath we draw is the source from whence we derive our supply of this indispensable element; that bodily energy is derived from the decay of living material—the oxidation of various complex substances—resulting in muscular force and heat; that life and death are so intimately connected with each other that the thoughtful mind cannot view the one without being confronted with the other, as we are continually dying while we live; a struggle between the two, with the inevitable result of victory in the end to the grim destroyer.

We will pass by the complicated actions and reactions by which katabolic and anabolic changes are produced, except in so far as oxygen has to do with them.

Without this element we should die. The importance of oxygen to the tissues is admirably illustrated in the almost instantaneous regeneration produced in the sloughing ulcer or cold abscess, when peroxide of hydrogen is brought in contact with it; the pus and putrid matter disappear as if by magic, and the surrounding tissues are so stimulated, that if brought into contact and antiseptically dressed, the parts will heal as if by first intention.

This wonderful local effect is but the expression of the great need of the entire organism for this element.

The efficacy of chlorate and permanganate of potassium, both powerful oxidizing agents in putrifactive and germ diseases, like scarlet fever, diphtheria, etc., is thus explained.

Septic matter, and the germs which accompany it, are destroyed when oxygen has full play; this is what keeps our bodies in an aseptic condition during life, and the lack of it is the cause of putrifaction after death; it is the sustainer and supporter of life, a necessity to animal existence; this is the reason we are endowed with breath.

We know the carcass of a slaughtered animal shortly undergoes putrifaction, and its incidental accompaniment, spores and microbes appear. Why? Because the circulation being cut off the tissue no longer gets its supply of this necessary element, brought from the lungs, and distributed through the organism; the blood, a fluid tissue, becomes pathologic, infective germs may then find in it a nidus for their development, while *normal blood is a germicide*.

And this brings us to a consideration of the question:

What proportion of the diseases afflicting mankind are caused by an insufficient supply, or a want of power to appropriate this vital element?

As to the supply, we may reasonably conclude that it is always sufficient inasmuch as the patient always breathes during life, and the composition of the air is such that the supply of oxygen is never absent.

If it be true that oxygen is a destroyer of septic material, its presence in normal quantity in the organism would also prevent the formation of such material, and keep the tissues free, not only from septic matter, but also from those germs which find their habitat in and depend upon diseased pabulum for their existence.

It is probable, that in cases where cell tissue is broken down, and becoming degenerate, where mal-nutrition and waste seems to be the tendency, where assimilation is inactive and vitality low, that the principal predisposing cause is that the organism is starving for oxygen, the breath of life; and if so, where shall we find the remedy, and how is it to be applied? It is a case of "water, water everywhere, and not a drop to drink."

It is stated that the proportion of carbonic acid excreted at each expiration is from three to six per cent., depending upon the length of time the air is retained in the lungs.

The elimination of this waste product, after inspiration of atmospheric oxygen, reminds one forcibly of the same reaction, oc-

curing when the solution of peroxide of hydrogen is applied to the sloughing ulcer, when, as physicians all know, there is an effervescence of carbonic acid gas, resulting from the combustion of putrid matter, leaving only water and clean tissues, the extra atom of oxygen having been expended in the reaction.

The atmospheric oxygen, in like manner, after being conveyed by the respiratory process into the animal tissues, acts upon the proximate principles therein contained, goes through a certain number of combinations, and is finally expelled in the shape of carbonic acid.

The oxygen thus absorbed combines with the proximate materials floating in the blood, and fits them for the formation of cell tissue; if deficiently oxidized in the lungs, the reaction is incomplete, the normal bioplasmic material is not produced, and a pathologic matter is substituted, which will not form healthy tissue.

But why should this condition of things be? Why does not the blood take all the oxygen required during the act of respiration?

Because, an element natural to the organism, and which is always present as an ingredient in the tissue forming material of healthy persons, and one of the offices of which is to contribute by its presence the necessary chemical affinity to this material, to take up and combine with the oxygen at the lungs, *is insufficiently supplied.*

This element is *oxidizable* phosphorus.

This will explain why, when oxygen is inhaled, in cases requiring it, that the treatment is abortive; there being a lessened affinity for oxygen, owing to the lack of oxidizable phosphorus in the organism, the oxygen cannot be utilized, and the restorative effect looked for is not realized.

This deficiency of the phosphide element has been variously accounted for; artificial methods of life, such as dissipation, sexual indulgence, want of out-door exercise, excessive mental wear, emotional and excitable temperaments, poverty and privation, unsuitable and insufficient food, etc., causing an undue waste and an insufficient supply from natural sources, of this essential requisite.

“That there is a direct connection between the excretion of the phosphates and waste of nervous element, is proved by the fact that this excretion falls to its lowest point during the cessation of nervous

activity; and that in the insane the excretion of the phosphates is considerably increased during paroxysms of excitement, while on the contrary, it falls below par during the subsequent period of exhaustion.

The consequences of the phenomenon or feeling of exhaustion do not, however, stop at the waste of the immediately available phosphide element contained in the nervous system. As this element exists in the albuminoid principles which constitute the bioplasm or histogenic stock from which all the organs and tissues of the system are formed; as there must be a balance between the proportions of this element contained in the different parts of the system, we have a right to infer that its decrease in one part must, after a certain time, produce a corresponding diminution in the rest; and, as we have found that the phosphide element is probably the exciting and initiatory agent of intra-organic molecular combustion, whatever produces a waste of the oxidizable phosphorus in the system must diminish general molecular oxidation and the amount of excreted carbonic acid.

Every kind of activity, whether intellectual, emotional, locomotory, or sensual, is therefore conditioned, either directly or indirectly, by a wear of the phosphide element, as shown by the excretion of the phosphates; and whenever this activity exceeds a certain limit the organism is no longer in a normal state."—*Churchill*.

It will thus be seen what an important part oxidizable phosphorus takes in the system by seizing and storing oxygen for economic use; but its utility does not stop here; it is a direct stimulant and tonic to the nervous system, irrespective of its use in attracting oxygen; the fact that it is found in largest proportion in the grey matter of the brain, the throne of nervous power, would of itself be sufficient reason for the belief that it is an element of vital necessity.

It can hardly be looked upon in any other light than as a necessary food supply, for it is an element in various foods of animal origin.

It is particularly present in milk, that remarkable secretion upon which infant life is almost exclusively dependent during its earliest period, and during which time there is wonderful progress in development, and the greatest need for all necessary elements to sustain rapid growth.

This phosphide element (oxidizable phosphorus) must not be confounded with the phosphate; phosphates are burned out ashes, so to

speak, in which the phosphorus has already combined with oxygen to saturation; it is therefore useless as an oxygen carrier, and useless as a means of promoting metamorphosis, as the compound leaves the body as it enters it, without change; it is a component of fully developed, and consequently, stationary histological elements, and is taken as such into the system, like other permanent salts, such as the carbonates, chlorides, etc.

The phosphorus in the Hypophosphite is combined with one atom of oxygen only, while the phosphate has already combined with five atoms; so that in the phosphate the whole of the phosphorus is already oxidized, while in the Hypophosphite four-fifths of the phosphorus is still in a combustible or oxidizable condition.

In the treatment of disease by Hypophosphites the object sought is chiefly and primarily the assimilation of oxidizable phosphorus (the electro-positive element of the salt).

This object is accomplished as well and as thoroughly by the exhibition of a single Hypophosphite as by the use of half a dozen; because when several are combined the dose is divided among the number used, and the aggregate quantity of oxidizable phosphorus contained in a dose of the mixture is no greater than the quantity contained in a dose of a single salt.

Thus the main object for which the Hypophosphites are given is accomplished as well by the use of a single salt as by a mixture of several.

It is being more and more acknowledged by the profession at large, that truly scientific treatment points in the exhibition of drugs to the use of such remedies only as are indicated by the condition of the patient.

Medicines given when not indicated are unnecessary, and cannot fail to do injury, because all medication is productive of some kind of action in the system, and if this action is not favorable it must be unfavorable, and consequently embarrasses and complicates the situation, adding new troubles to those already present.

This reasoning applies with peculiar force, in the use of the Hypophosphites, particularly in the treatment of phthisis, when vitality is low; the circulation is feeble, the patient is weak and emaciated; there is a fierce conflict going on in the organism, in the

struggle for life against the elements of death, which have already become located in the tuberculous lung, and by absorption have poisoned the circulation in the production of septicæmia.

The blood vessels are thin and liable to rupture because their substance has been appropriated, and owing to defective assimilative action have been deprived of their customary nutrition.

Surely, the patient has already enough to battle against, without additional and unnecessary complications.

Now the whole trouble and objection to the use of combinations, lies in the effects of the electro-negative elements, which produce secondary and complicating difficulties.

Dr. Churchill has found that gastric troubles, such as indigestion, flatulence, diarrhœa, are a frequent consequence of the use of, as he terms it, "A jumble of different Hypophosphites and strychnia."

The danger attending the use of iron in phthisis is the production of hæmorrhage. Churchill says: "Not only was hæmorrhage produced in almost every instance in which I used the Hypophosphite of Iron, but in patients who have been previously taking ferruginous medicines, it will be found that it is very difficult at first to keep the effects of the Hypophosphites within the limits of their physiogenic action."

Potassium is a powerful resolvent of condensed and consolidated lung tissue, causing softening of tubercular matter with a rapidity that may be dangerous and alarming.

The depressing action of potassium is also well exemplified in the observed effects of iodide of potassium, which, as physicians know, produces prostration, indigestion, loss of appetite, etc., which is solely due to the *base*, potassium.

Manganese is similar in its action to iron, and produces similar results, though not quite to the same extent.

Lime and soda; the Hypophosphites of these bases, while acting similarly in some respects, possess marked differences in action in others, which very often prevent their favorable action when combined.

Hypophosphite of lime frequently checks expectoration too rapidly, resulting in increased cough; it also is more apt to produce the pathogenic effects of the Hypophosphites than the soda salt;

thus the lime, in combination, might be doing a positive injury to the patient, which would have been wholly avoided if the soda were given alone; on the other hand, when the expectoration is too profuse, the soda should be replaced by the lime salt; this will be sufficient to show that there are many instances when both salts, in combination, are contra-indicated, and will convince the careful physician of the desirability of discriminating according to symptoms, using them singly or alternately as circumstances require, particularly when no advantage is to be gained by combination, and much may be secured in definite results by using them singly or in alternation.

Statements that Dr. Churchill uses the salts of lime and soda in combination, and recommends them thus combined, are false, and misrepresent his views and practice, as every physician knows who has read his works.

The pathological effects of over-dosing are disastrous. By increasing too suddenly the force of the circulation, without giving time for increased nourishment and strength to the texture of the weakened and impoverished blood vessels, the tissues of which have been appropriated by the urgent need of the general system, as from lack of proper assimilation of food, the patient has been living upon his own tissue—a hæmorrhage ensues. The crisis is referable directly to the sudden and over stimulation of the circulatory system, beyond the capacity of the the blood vessels to resist. Another result of over-dosing is a too active disintegration of the tubercular deposit, causing a crisis by sloughing. This process, which is therapeutically desirable, must not go on too fast, beyond the strength of the patient to bear. Time is a necessary and indispensable element in the recuperative process. It must not be forgotten that all the functions must improve together, for which time is necessary, as new tissues must form and metamorphosis must take place, and morbid and prurient matter must be eliminated; hence care should be taken to go slow, constantly watching for pathogenic phenomena, never running risks because the patient shows, at first, brilliant results by large doses, for he will soon cross the line upon dangerous ground, and the sudden relapse will remove him from the crest of the wave that seemed bearing him on to victory, to the dark valley of the shadow of death.

While the smallest doses should, therefore, be administered at first, and gradually and watchfully increased as the patient is found to bear them without showing signs of pathological effects, the limit or maximum quantity to exhibit during twenty-four hours should not exceed *seven grains*, and in many cases, especially when the disease is far advanced, this quantity will be found too great. In fact it is unsafe to give *alkaline* Hypophosphites at all, in treating *extremely advanced cases*, the Hypophosphite of Quinine being far preferable in the initial treatment of those in this condition, until it is found practical to use either the lime or soda salt, according to indications, in, at first, very small doses.

It being borne in mind that the main object sought in using Hypophosphites is to assimilate oxidizable phosphorus (the electro-positive element of the salt), and that this object may be obtained by the administration of any one of these salts, as well, as if a combination of several were used, it becomes a matter of great importance to investigate the effects upon the patient of the several electro-negative bodies, that we may eliminate all those which are found to produce unfavorable effects, and to confine our use to such only as will best agree with the patient. Dr. Churchill has paid great attention to this point, and he has found it inadvisable and dangerous to use Iron, Potassa, Manganese, or, in fact, any others than Lime, Soda or Quinine. He never prescribes combinations, even of these, but uses that one found to best meet the indications of each particular case in accordance with the symptoms of the patient, or the effects produced by the remedy, varying the dose as circumstances require.

In Phthisis, *complications* must of course be treated by appropriate remedies, but during such treatment the use of the Hypophosphite should be suspended. Unless during such crisis, no other medicine should be given, reliance being placed entirely upon the Hypophosphites to relieve cough, night sweats, etc. Narcotics and stimulants should not be used if the Hypophosphite treatment is adopted, as they prevent the proper effect of the remedy, and lower the vital condition of the patient in the end, though they may apparently lessen some of the urgent symptoms. Neither should Cod Liver Oil be used for similar reasons.

In a number of instances physicians have written, complaining that their patients were not progressing well under the treatment and it was found that they were using morphine to procure rest at night and to allay cough. Upon discontinuing this, the patients suffered more for a day or so, but afterwards improved right along and made good recoveries.

Other instances have occurred where the dose was too large and the patients not only failed to improve but were actually suffering relapse, when the dose was discontinued for a few days and then resumed in much smaller quantity with the happiest results.

If the patient is not progressing, be assured there is a reason for it, and, generally, one that can be controlled. Do not blame the remedy when the fault is because of its inconsiderate use. Either the wrong salt is being administered; or, what is worse, a combination containing contra-indicated salts; or some other remedy is being used which prevents the favorable action of the Hypophosphite; or the dose is too large; or the patient is suffering from a complication which interdicts the use of the Hypophosphite for the time being; or the Hypophosphite is impure, and consequently *unable to produce favorable results.*

Purity a Necessity.—All authorities are now practically unanimous in the conclusion that to produce the therapeutic effect with the Hypophosphites, it is necessary that they should be chemically pure.

It must be remembered, that if these salts are carefully prepared in this condition, but kept in the saline state, they rapidly deteriorate and become impure; that they cannot be kept, as salts, and remain fit for medicinal use.

It is necessary, that as soon as they are prepared, they should be protected by sugar, in the form of syrup, from atmospheric oxidation.

This is why Churchill insists upon the use of syrups containing chemically pure Hypophosphites; and why the writer in carrying out his views, prepares these salts only in the form of syrups, and also why they are only put up in small bulk, as a small quantity is exposed, in use, less to the air than a large quantity, and is very much more likely to retain its medicinal value, than if exposed in large bulk to constant new accessions of air while in use.

It seems to have become a favorite remark with some manufacturers that their preparations are made with a "slight alkaline reaction" as though this was a very important advantage, when, in fact, it is an open confession of impurity. With a little more chemical knowledge it would be seen that "alkaline reaction" means the presence of "free alkali" or its "carbonate," which, not being a Hypophosphite, is manifestly an impurity, as the Hypophosphites of the alkaline bases, when pure, have a *neutral* reaction. Churchill claims that the presence of these impurities renders them next to useless by preventing their favorable physiological action. He cites instances. Having obtained the favorable action of the pure Hypophosphites in several cases of Phthisis, he purposely added an alkaline carbonate when his patients at once began to lose ground, which continued while the impure salt was used. When, however, they were put upon the pure salt again, they improved as before. The experiment was tried again and again, until the cause of retrogression was fully demonstrated. Again, if the combination contains Hypophosphite of Iron, the presence of free alkali will cause its precipitation.

Indications, in Other Conditions than Phthisis.—Hypophosphite of Iron is indicated in Anæmia, Chlorosis and Dysmenorrhœa. Hypophosphite of Potassium is recommended in Asthma. Hypophosphite of Quinia as a general nervous tonic and in Intermittent Fever. Both the Hypophosphite of Lime and the Soda Salt are indicated in disease characterized by insufficient nutrition, as marasmus, and in convalescence from wasting disease of any kind, where the vitality is low, assimilation of food defective, blood depraved, and functional activity impaired.

The combination of the Lime, Soda, Iron and Potassa Salts has been found very effective in obstinate Bronchial coughs, and in the impoverished condition which precedes and accompanies boils, abscesses, carbuncles, etc., in non-tubercular cases.

Hypophosphite of Manganese is similar in its action to that of the Iron Salt, but is much less energetic. It has a special excitatory action upon the biliary secretion, and it has been found peculiarly useful, either alone or in conjunction with Hypophosphite of Quinine, in hepatic derangement, with deficient biliary secretion, subsequent

upon prolonged residence in tropical climates, as also in cases of Anæmia and general debility depending upon the same cause.

Hypophosphite of Ammonium resembles the Potassium Salt in its general therapeutic action. It has been used by Churchill with great advantage in hepatic derangement, owing to its special stimulating effect upon the liver.

It is, however, contra-indicated in Phthisis, for the same reasons which forbid the Potassium Salt, and probably for the additional one that the Ammonium compounds all excite the circulatory system, which renders them dangerous in hemorrhagic states. The same writer considers this salt far superior to the muriate or carbonate as a laryngeal stimulant. As an expectorant, it is peculiarly active.

It should be remarked that in diseases uncomplicated with pulmonary difficulty, not only may the dose be larger, but various combinations may be prescribed, and the remedy continued with less necessity of watching the patient, the pathological effects of these remedies being far less liable to be produced than in cases of Phthisis, in which disease the susceptibility of the patient to their action is greatly increased by the diathetic state.

Children of tuberculous parents who have inherited the diathesis, are wonderfully improved by the hypophosphite. (See case mentioned by Dr. J. R. Fraker, Marlboro, N. Y., page 99. Also Dr. Wrightson's case, page 113.)

To those of the profession who, having previously tried the Hypophosphites without success, and who have consequently given up their use, the evidence of Dr. S. T. Lowrie, Lore City, Ohio, will be of interest. (See his letter, page 100.)

Dr. William Porter, of St. Louis, Mo., gives some very convincing facts, drawn from his personal experience, as to the great advantage derived from the use of these single, chemically pure salts over the various commercial salts in combination in tuberculosis. (See his paper, reproduced on page 100.)

The late lamented Dr. W. F. Hutchinson's opinions on the Hypophosphites in nervous diseases, a specialty in which he was an acknowledged expert, will be found in his paper (page 105).

For a remarkable effect of the Hypophosphite of Lime in its influence in cases of difficult and retarded dentition in children, see note from Dr. C. C. Stephenson, Little Rock, Ark. (page 106).

In a case of syphilitic tumor, after treating the case specifically until the tumor was absorbed, it was found that the lesion had produced loss of memory and power of co-ordination. The treatment at this stage of the disease by Hypophosphite of Lime at first, and subsequently with Hypophosphite of Manganese, with still more marked results, furnishes a remarkable illustration of the restorative power of these remedies in brain lesions. The case was reported by Lewis G. Pedigo, A. M., M. D., Crockett Springs, Va. (Page 106.)

In the same paper Dr. Pedigo pays a high tribute to the efficacy of Syrup Hypophosphite of Lime in the sub-acute and chronic inflammations occurring in the bony and periosteal tissues of scrofulous or badly nourished patients, as a result of a blow or injury, which usually result in hip-joint, Pott's disease, or some other grave lesion of this character. He gives the history of a case of this kind, with complete recovery, where from the unfavorable constitutional state and family history of the patient, the prognosis was bad.

As reconstructives in cases of defective nutrition, loss of mental and physical vigor, nervous prostration, etc., there is probably no equal to the Hypophosphites, provided the properly indicated salt is used. This is very important. Dr. Boum, of Providence, R. I., contributes a valuable paper upon this view of their action (page 109).

Q. C. Smith, M. D., Austin, Texas, publishes the result of his experience in the use of these syrups in cases of delicate and weakly children. (Page 112.)

Abundant evidence, corroborating the conclusions of Dr. Churchill, as to the curative effects of the Hypophosphites in phthisis, is at hand.

But this favorable result, it must be borne in mind, will not be reached, unless certain well-known methods are followed, which are fully explained in this brochure in the various quotations from Churchill, De Brémon, J. C. Thorowgood, and other eminent authorities.

The fact is that the methods of Churchill are so very different from the usual ones employed by the profession in the treatment of this disease, and differ so materially from those at present advocated and followed by the majority of medical men that the first thought of a physician is to rebel against its arbitrary ruling concerning the

use of cod liver oil, stimulants, narcotics, etc. Now, if the methods in use had been found to be efficacious, and a considerable number had been found to recover under treatment, there would be good reason to cling to it. But physicians know that the contrary is the fact, and are obliged to acknowledge that the disease is practically incurable, except about one per cent. of the cases, which cure themselves. If this is so, why not adopt a treatment, which in other hands has proven its superiority? *This fact is proven by cases reported in this pamphlet.*

I would again remind the reader just here, however, that the *details of methods* enumerated by Dr. Churchill, *must all be followed or disappointment will result.* A physician cannot say that he has followed Churchill's suggestions unless he has been willing to study and become familiar with them in their entirety and strictly carried them out. To facilitate this and make it easier to grasp most of the methods quickly, I have summarized the general plan under thirty heads. It will be found on page 27 of this pamphlet.

This table, however, does not comprise the whole by any means, but lays down a large number of recommendations, which will assist the prescriber who wishes to test Churchill's methods; the balance can only be obtained by a study of his writings, very much of which is quoted herein, (pages 35 to 80); and also the matter written by the late L. de Brémond, M. D., who was intimately associated with Dr. Churchill for many years as his clinical assistant, and who reports an experience in New York and vicinity of more than 150 cases treated.

A case of a girl 16 years old with inherited phthisis, when the family, father and four children, (the father dying at 35, and the four children all died before reaching 17 years of age), had been swept away with the disease, is given by Dr. J. T. Wrightson, Newark, N. J. This child was completely cured, was married, and now has a family (page 113).

See also case of tuberculosis reported by Dr. A. Ostertag, St. Louis, Mo. (page 113)

Joseph M. Patton, M. D., Professor of Internal Medicine, Chicago Polyclinic, in a valuable and instructive address before the Chicago Medical Society, says:

"In my own practice, both public and private, I have for a num-

ber of years past treated cases (of phthisis) with Hypophosphites in the form of a syrup of whichever salt was indicated; I prefer Gardner's syrups as being the most stable on the market. This must not be confounded with the combined Hypophosphites. The latter preparations I used for several years in a large number of cases, and became finally convinced of the truth of Churchill's teachings, that the compound syrup of the Hypophosphites is *distinctly injurious* to phthical patients. The Hypophosphite of Soda is generally the most useful, and is given in apyretic cases where there is not much expectoration.

The quinia salt is used temporarily when the temperature is over 100° F., and the lime salt where there is too free expectoration, six or seven grains daily being the maximum dose." (Page 113).

For reports of additional cases of phthisis cured by Hypophosphites, the reader is referred to papers of the following physicians, republished herein.

(Three cases in the first, second and third stages, selected at random, to illustrate his method, by the late L. de Bremon, M. D., page 92.) History of twelve cases of Phthisis Pulmonalis, treated by Syrups of Hypophosphites, eight recoveries, four deaths, by W. H. Bentley, M. D., Cold Spring, Woodstock P. O., Ky. (page 95); J. R. Fraker, M. D., Marlboro, N. Y. (page 99); Malcolm Graham, M. D., Jonesville, Mich. (page 102); J. C. Willson, M. D., Morley, N. Y. (page 103); P. J. Bailey, M. D., Dawson, Ky. (page 104); Walter M. Darnell, M. D., Belton, Texas, (page 104).

Richitis.—The *Clinical Record* is full of instances of cure of this condition by Hypophosphite of Lime. A. Springer, M. D., Lewiston, Me., gives experience at the "Home" for sick and needy children at that place. (Page 117.)

PHOSPHORUS ASSIMILATION.

THE ELEMENT AND ITS COMPOUNDS CONSIDERED AS TO AVAILABILITY

By R. W. GARDNER, New York.

(Published by *New York Medical Record*, January 27, 1877.)

When phosphorus is administered in a free state its irritant action forms the greatest objection to its use, and limits the quantity

which may be given with safety; it is also necessary to give it upon a full stomach, as a precautionary measure, as otherwise it is found to attack mucous surfaces and produce irritation; the extent of such action depending upon the quantity administered or the length of time the remedy has been continued. The largest dose usually given is about one-twentieth of a grain, though one-twelfth has been administered, but not until the tolerating power of the patient had been carefully tested. Given in doses of from one-hundredth to one-thirtieth of a grain, it often produces dyspeptic symptoms, and the remedy has to be discontinued.

Let us consider why this occurs.

Phosphorus has such a powerful affinity for oxygen, that it must be kept under water, for when exposed to atmospheric air its union with oxygen is so violent that it inflames spontaneously. This explains its corrosive action to the stomach, modified, no doubt, by its surroundings, but nevertheless capable of producing the most serious results upon the delicate mucous surfaces which are directly exposed to its influence.

Phosphorus cannot be absorbed in its pure, (elementary) state; a certain degree of oxidation must have taken place before it reaches a condition adapted for assimilation.

When it has thus become partially oxidized, however, it has lost its corrosive action, and is then, and not until then, in a condition to fulfill its valuable agency in contributing to nerve power and vital force.

The remedial action of phosphorus is doubtless exerted from the time it has become sufficiently oxidized for absorption, and during the whole of its subsequent oxidation, until it has finally reached its ultimate oxidized state, the phosphate.

My reasons for forming this conclusion are, that the eliminations of phosphorus from the body are *always in the condition of phosphate*, and also that the phosphate is so firm in its chemical behavior as to lead naturally to the belief that for this purpose it is unavailable, or to use a vulgarism, it has "burned out" and having passed its period of usefulness, is eliminated.

Phosphorus exists in the vegetable world in the condition of phosphate only; in animal tissues and in fish, etc., in a partially oxidized

state, constantly undergoing the oxidizing process, and finally being thrown off as effete matter.

Does not this, at least partly, explain the superior vitality and nervous power of those who partake largely of animal food?

It is also rarely the case that animal organisms appropriate elementary substances directly. If we examine the matter, we will find that all articles of food, contain these elements in a condition of chemical combination, and by a reciprocal action nature discards useless or exhausted substances for such as she requires, each immediately forming new compounds, the one destined for elimination, the other for assimilation.

These views naturally lead to the conclusion that phosphorus should be preferably administered in its lowest oxidized state, rather than in the elementary condition, and never, where its assimilation is desired, in the condition of phosphate.

The next question is, how to get at it?

Phosphorus, uncombined, passes directly to its highest condition of oxidation, unless retarded by chemical union with a base; this leads us to a second conclusion, viz.:

That phosphorus in its most desirable form cannot be obtained except by such a chemical combination as will stay the oxidation at this point, and render it available for therapeutic action. In the search for such a compound, there seems none so well suited to the purpose as the several Hypophosphites.

They embrace quite a range of salts, lime, soda, iron, potassium, manganese, quinia, etc., each capable of playing an important part in a subordinate capacity, while the phosphorus element becomes the most important. The phosphide of zinc has been suggested and used to some extent, but this does not seem a sufficiently definite compound, producing irritant action and unpleasant results. The Hypophosphites, however, while entirely non-irritant, and held by such a feeble affinity as to be readily decomposed, not only contain oxygen in its least combining proportion, but represent a larger proportion of phosphorus, relatively, than any of its other compounds.

It is found, however, that unfortunately their therapeutic value is

much lessened by the impurities always found in the commercial salts and the ordinary preparations of them.

It is very desirable that they be administered in a perfectly *pure* and *neutral* state, and unless they have been given in this condition, their medicinal value has not been properly tested. This is proven by the superior results attained by the use of such salts at the European hospitals.

The salts, being chemically pure and in solution, should be preserved against putrefaction and atmospheric influence by conversion into syrups.

Sugar is the best preservative agent, as it does not cause decomposition and excludes atmospheric air. Prepared in this manner the salts have been found much more prompt and assimilable.

They should be almost wholly devoid of medicinal taste, except in the case of iron, and in this the ferruginous taste is only mildly perceptible. The syrups of lime, of soda, and of potassa should be entirely free from the alkaline taste common to these preparations, and should never let fall a precipitate, which is a sign of the presence of impurity.

GARDNER'S SYRUPS OF CHEMICALLY PURE HYPOPHOSPHITES.

Prepared in strict accordance with Churchill's views, enabling physicians to follow his methods in the treatment of phthisis, by which thousands of authenticated cases have been cured.

SUMMARY OF CHURCHILL'S METHODS IN PHTHISIS.

1. The Hypophosphites of Soda, Lime and Quinia are the *only ones indicated*.
2. The Hypophosphite must be *chemically pure*.
3. They must *not be combined* for use in phthisis.

Why not? Because they act in antagonism to each other, the different bases being indicated in *different* stages of the disease and the several salts differing in therapeutic action.

Churchill *never uses them in combination*.

All statements that he did or does are false and misleading.

The proofs of the above are in *this pamphlet*.

4. The Hypophosphite should be used only in the form of *syrup*. Why? Because as salts they will not keep in the proper condition, the protective action of the sugar being necessary to prevent *atmospheric oxidation*.
5. The pure Hypophosphites are *neutral* not *alkaline*.
6. Soda is indicated in the *incipient* stage, as a rule, with *exceptions*.
7. Lime is indicated in the *second* and *third* stages, as a rule, with *exceptions*.
8. Hypophosphite of Quinia is indicated in the *initial* treatment of *far advanced* cases, to be followed by the Hypophosphite of Lime, or Soda, later on, when it can be borne.
9. Lime *reduces* expectoration, frequently causing cough; the soda should then be used.
10. Soda mildly *favors* expectoration; if too free, the lime should be substituted.
11. The tendency of the Hypophosphite is to create *plethora*.
12. While this condition is necessary to the cure, it favors hemorrhage.
13. Discriminating dosage is therefore necessary.
14. *Any* Hypophosphite given too freely will produce pathogenic or toxic effects, such as a too rapid softening and expectoration of the tubercular deposit, lassitude, prostration, headache, giddiness, fever, indigestion, loss of appetite, colic or diarrhœa, epistaxis and hæmoptysis.
These effects are produced more readily by some salts than by others.
Of those used in phthisis, viz., lime, soda and quinia, the lime is the most apt to be productive of these undesirable results.
15. If weak and emaciated, or if the case be well advanced, let the commencing dose be very small, *even one grain* in twenty-four hours in some cases, and, if well borne, gradually increase, keeping well within the physiological effect.
16. The *maximum* quantity to exhibit in phthisis, during twenty-four hours, is *seven grains*.
17. Do not give *any other drug* with a Hypophosphite.

18. Lay aside the Hypophosphite when combating complications.

19. Cod liver oil is *contra-indicated* in any stage of the disease.

Why? Because it produces plethora; the Hypophosphite also produces plethora; when used together, such a plethoric state is produced that, to avoid hemorrhage, the Hypophosphite must be discontinued; the Hypophosphites, being the remedy for the diathetic state, must be continued, or the treatment is useless.

20. All stimulants are *contra-indicated*.

Why? They prevent the return of strength and bring on a recurrence or an aggravation of cough, fever and sleeplessness. As their effect upon the system consists in a stimulation of the circulation and a diminution of oxidation, it is directly *contrary* to that of the Hypophosphites.

21. You should usually get results within *two weeks*.

22. If not, look for the *cause*.

It will, generally, be found to be one of the following:

The Hypophosphite is *impure* and incapable of producing proper results.

You are producing pathogenic effects by *overdosing*.

You are using *stimulants*, which prevent the action of the Hypophosphite.

You are giving *anodynes* or *other drugs* to allay cough, procure sleep or control night-sweats.

You are using *contra-indicated Hypophosphites*, or combinations of them, the bases of which are therapeutically antagonistic, or produce pathogenic effects.

You are giving *cod liver oil* along with the Hypophosphite.

A complication has arisen which requires special treatment.

The disease is so far advanced as to be hopeless.

23. Continue the treatment within physiogenic limits, intermitting every third week, until the diathesis is removed, and then use occasionally as prophylactic.

24. Gardner's Syrup of Hypophosphite of Lime, and Syrup of Hypophosphite of Soda, each contain twenty grains of the chem-

ically pure salt to the ounce. Each teaspoonful, therefore, represents two and one-half grains.

This quantity three times a day is the *largest amount* that should ever be prescribed in phthisis.

The average dose, in this disease, is *much less*.

The physiological dose will *vary with every case*, and must be carefully sought and the patient frequently observed, lest the remedy produce pathogenic effects.

The syrup may be given in milk, coffee, water, or in a little lemonade, if it is found to be more acceptable to the patient.

25. Gardner's Elixir of the Hypophosphite of Quinia contains eight grains of the chemically pure salt in one ounce.
26. Night-sweats will yield, in time, to the Hypophosphite *alone*.
27. Complications must be treated as they arise, discontinuing the Hypophosphite in the meantime, but resuming it again when acute symptoms have subsided.
28. In case pathogenic symptoms are accidentally produced, at once discontinue the Hypophosphite, and take it up again after ten days or two weeks, in smaller quantity.
29. Much further information is contained in the body of this pamphlet.
It will pay you to read it carefully.
30. Physicians desiring to test this treatment will please bear in mind that the chemical purity of the salts is an absolute necessity for success; that they must be specially prepared and immediately protected in syrup to preserve them in a proper condition for medicinal use; that some unprincipled druggists do not hesitate to *substitute* preparations made by themselves or bought in bulk in the market, even when a particular manufacture is stipulated by the physician on his prescription. Obviously, then, the treatment has *not been properly tested*, unless the *paramount condition of purity* has been observed.

GARDNER'S SYRUP OF CHEMICALLY PURE
HYPOPHOSPHITE OF SODA.

Strength.—Twenty grains in one fluid ounce.

Dose.—Variable in phthisis, and never more than one teaspoonful three times a day.

In other diseases larger doses may be used, though one teaspoonful three times a day is an average dose.

Indications—

Phthisis.—In the early stages of the disease, as a rule, unless contra-indicated; when expectoration is not sufficiently free; in any stage of the disease, as an alternative, when the lime salt, being indicated, disagrees. [Exception.—In the initial treatment of far advanced cases, when the quinia salt would be indicated.] As a prophylactic in convalescence.

Defective Nutrition.—Adynamic conditions of the nervous system, marasmus, amenorrhœa, functional inactivity, convalescence from low forms of disease, impoverished blood [boils, abscesses, pimples, etc.]; uterine fibroids, mental and cerebral diseases, subacute and chronic bronchitis, and in the sequelæ of inflammatory diseases of the respiratory organs; convalescence from "la grippe" and pneumonia.

GARDNER'S SYRUP OF CHEMICALLY PURE
HYPOPHOSPHITE OF LIME.

Strength.—Twenty grains in one fluid ounce.

Dose.—Variable in phthisis, and never more than one teaspoonful three times a day.

In other diseases larger doses may be used, though one teaspoonful three times a day is an average dose.

Indications—

Phthisis.—Second and third stages; when diarrhœa is present; if patient is pregnant; when expectoration is too profuse; in any stage of the disease, as an alternative, when the soda salt being indicated, disagrees. [Exception.—In the initial treatment of far advanced cases, when the quinia salt would be indicated.]

Defective Ossific Action. [Rickets, defective teeth in adults, difficult and retarded dentition in children; broken limbs and fractures].—Adynamic conditions of the nervous system; defective nutri-

tion; chronic myelitis; chlorosis; anæmia; functional inactivity; weakness during pregnancy and lactation, and in all diseases depending upon incomplete and retarded development.

FREE PHOSPHORUS INVARIABLY AND NECESSARILY CHANGED TO HYPOPHOSPHITE IN THE STOMACH BEFORE ABSORPTION.

BY R. W. GARDNER, NEW YORK.

(Published by *New York Medical Record*, February 22, 1879.)

It is claimed that the chemical changes occurring to substances after entering the body, cannot be followed out intelligently owing to the complication caused by the modifying influences of vital and functional action, the presence of a multitude of substances, and the changed scene of action as compared to the laboratory, rendering it impossible to note changes as they occur; all of which, as a rule, with some exceptions, is doubtless true.

One exception to this rule, I believe to be the changes undergone by free phosphorus from the time of its introduction into the stomach until by absorption it leaves it.

My reasons for thus excepting phosphorus during the period mentioned are:

That it is an element incapable, primarily, of chemical action in such locality, except in certain well-known directions, which change is a necessity with it, as a preliminary step to further combinations.

The first change that occurs must be that it unites with something else, because, being an element, it is itself ultimate; it therefore exerts single elective affinity—its strongest affinity is for oxygen.

Having proceeded thus far, I will state my reasons for the conclusions heading this paper:

Solutions of phosphorus are precipitated in the stomach previous to assimilation.

Water precipitates phosphorus from its solutions, when it mixes with its solvent.

Therefore, phosphorus must be precipitated from its alcoholic solution by the aqueous character of the stomach secretions.

Phosphorus dissolved in ether, if given in this form, is left by the evaporation of the solvent; and the oleaginous solution, having undergone pancreatic emulsification, is changed by that process to a condition which admits of union with aqueous secretions in any proportion, and as emulsification must have taken place before fats can be absorbed, the phosphorus, but sparingly soluble in the oil originally, must be precipitated when the oil is not only emulsified, but combined with aqueous secretions at the time of assimilation; hence, phosphorus, even if given in solution, reaches the condition of substance in the stomach, before absorption can take place.

Phosphorus being insoluble in stomach juices is incapable of endosmosis, until by chemical change, it is rendered soluble.

Its natural and strongest affinity being for oxygen, an atom of phosphorus (P), unites with an atom of oxygen (O), two molecules of water from the stomach secretions (2 H O) now unite with it, and the result is 2 H O, P O (Hypophosphorous Acid), and as the free acid cannot exist in the presence of bases without union, and as such bases are always present in the stomach, this union occurs naturally, and a Hypophosphite is produced, affording the first soluble condition of the phosphorus originally given—necessarily in very small proportion, from the limited quantity of phosphorus ($\frac{1}{100}$ to $\frac{1}{20}$ of a grain) tolerated by the patient.

During the oxidation of the phosphorus in the stomach, phosphoretted hydrogen, is given off (a result always occurring during the primary oxidation of phosphorus), and this having an avidity for water, is taken up by the stomach juices, and being then in a condition favorable for such action, is absorbed.

This accounts for the constitutional toxic action of phosphorus, evidenced by hæmatomata upon the heart, pleura, liver, kidneys, etc.,—for the odor of phosphorus pervading the body of a person poisoned by phosphorus, and also for the peculiar “match-like” eructations complained of by patients when taking free phosphorus.

HYPOPHOSPHITES VERSUS PHOSPHATES.

By R. W. GARDNER.

(Published by *New York Medical Record*, December 17, 1881.)

I have prepared a statement of the amount of phosphorus contained in Hypophosphites and phosphates, showing the superior power of the Hypophosphites over phosphates, as a carrier of this element, and accompanied by a brief statement, showing *why* Hypophosphites are the best assimilants of phosphorus.

(O = 8.)

HYPOPHOSPHITES. 100 PARTS BY WEIGHT.	PHOSPHORUS, PER CENT.	PHOSPHATES. 100 PARTS BY WEIGHT.	PHOSPHORUS, PER CENT.
Lime	36.47	Lime (bone phosphate).....	13.46
Soda	35.10	Soda (crystal. tribasic).....	8.61
Potassium	29.75	Pot. (neutral tribasic).....	17.67
Iron (ferrous salt).....	33.33	Iron (ferrous tribasic).....	17.22
Quinia (soluble).....	8.33	Quinia (neutral tribasic).....	4.20

Also a table, showing the percentage by weight of oxygen, necessary to be absorbed by the phosphorus element of the Hypophosphites, to convert them into phosphates, while the latter, being already fully oxidized, absorb none.

(O = 8.)

100 PARTS BY WEIGHT OF HYPOPHOSPHITES MUST ABSORB OF OXYGEN.	PER CENT.
Lime, to convert into phosphate, must absorb.....	37.65
Soda, " " " " " " " "	36.24
Potassa, " " " " " " " "	30.71
Iron, " " " " " " " "	34.41
Quinia, " " " " " " " "	8.60

As Hypophosphites become oxidized, the relative proportion of phosphorus contained in the resulting compound becomes less by the increase in weight of the substance, and the power to absorb oxygen (to which property the therapeutic value of these salts are mainly due) becomes less and less, until, when fully oxidized to the condition of phosphate, their efficacy as phosphorus assimilants ceases. * * *

CHURCHILL AND OTHER EMINENT AUTHORITIES ON
THE THERAPEUTIC ACTION OF HYPOPHOSPHITES,
IN PHTHISIS AND OTHER DISEASES.

Physiogenic Effects.—Physiogenic action consists in the increase or decrease of some one, or several, of the natural functions, without their exceeding the physiological or their natural and healthful limit, and consequently without the production of morbid phenomena. These may be classified as follows:

Increase of nervous energy, with unusual feeling of ease and comfort.

Increase of appetite, improved digestion, more regular action of the bowels.

Increased activity of hematosis, or the blood-forming process.

After a time, evident signs of venous plethora, shown in color of the face, redness of the mucous membrane of the lips and eyes, and the fullness of the superficial veins.

Menstruation becomes easier, more abundant, and regular.

Patient generally gains in weight, with, seemingly, at first, no increase in adipose tissue.

This increase of nutritive action is sometimes remarkably manifest in development of hair and teeth."

[When given to teething children who are pale, peevish, sad, emaciated, without appetite or strength, suffering from fever and diarrhoea, loss of sleep, and apparently in imminent danger of convulsions, I have never seen a single case where the whole of these symptoms have not yielded to a few doses of Hypophosphite of Lime, and the evolution of the teeth afterward, proceed as if in perfect health.]

Pathogenic Effects.—These include all effects produced by the remedy, different from those which exist in the normal state. As soon as there is any manifestation of a morbid phenomenon, the action must be looked upon as pathogenic.

These effects are produced when the Hypophosphites have been taken too long, or in too large doses.

Breathing may become short and uneasy; there are pains in the

chest and aggravation of cough and expectoration, and at this period auscultation frequently shows increase of the local signs, consequent upon augmented hyperæmia of the lungs.

If, in spite of these symptoms, the use of the remedy is persevered in, hæmorrhage takes place from the respiratory, or even from the digestive mucous membrane. This generally makes its first appearance in the shape of bleeding from the nose, after which there may be an attack of hæmoptysis, perhaps for the first time.

Persons kept in this condition for a time are affected with piles, and those which they formerly had, and which had disappeared, are reproduced; this may go to the extent of real intestinal hæmorrhage.

Most of the symptoms may show themselves from the very beginning of the treatment, if it is begun with too large doses.

They are more easily and rapidly produced in proportion to the youth and sensitiveness of the patient, as in the case of women, children, and people of nervous or sanguine temperament.

Among the different signs of this pathogenic condition, two deserve particular attention.

Fulness of the face; and bleeding at the nose.

The fulness of the face, as the name indicates, refers to a peculiar look of the patient, similar to what may be observed in delicate persons after a hearty meal, or after moderate exercise. There is often a flush on the face; which to the inexperienced observer resembles that of perfect health; the cheeks are less hollow, sometimes appear quite full, and when this state has reached its maximum, there is a slight swelling or puffiness of the malar region, and the lower eyelid.

This peculiar aspect is not the same as the look of hectic fever. The redness of the facies is not sharply circumscribed to the cheeks, but spread over the whole face, as in a state of health.

When once carefully observed it is not difficult to recognize again. The slighter the amount of local lesion, the more strongly marked it appears, and the earlier it occurs; sometimes at the end of a few days.

It is more apparent in persons of a lymphatic or sanguine, than those of a bilious or nervous temperament.

This is a sign of great clinical value, for it indicates that the

physiogenic action of the remedy is near or has already reached its maximum.

It is therefore highly important that it should be recognized in time, as it enables the physician to foresee, and consequently by suspending or decreasing the treatment, to prevent the accidents or complications which would not fail to follow if it were injudiciously persevered in.

This fulness of the facies marks the limit of physiogenic action.

Epistaxis shows that the patient is entering the sphere of pathogenic phenomena. These latter are frequently preceded by this sign, which is, therefore, particularly worthy of attention.

I have shown the necessity of distinguishing between the physiogenic action of a remedy and its pathogenic manifestations. In like manner it is indispensable that a distinction should be made between its therapeutic effects, and the curative result.

As I have already explained, the therapeutical effects of a medicinal agent are the result, either of its physiogenic or of its pathogenic action; but they are of a more complex order, while they are less complex than the curative result.

Each step in these different orders of phenomena, therefore requires for its manifestation an increasing number of conditions, because each step in the scale is more complex than the one which precedes it.

The cure will be the final term, the result of the different antecedent modifications produced in the system and can only be arrived at *provided they are maintained within certain limits, and kept up for a sufficient length of time.* Churchill.

The Bacillus.—Upon this subject Dr. Churchill says:

The discovery by Koch, of a micro-organism characteristic of tubercle, has induced some people to suppose that the new theory rendered all our previous knowledge of the subject useless. Let us see how far this is correct.

The ascertained facts may be summed up as follows:

The cells of tubercle, particularly the giant cells, contain microscopic objects, having the shape of rods, which occur singly, in pairs, or in bundles. They are non-motile, they form spores, can be culti-

vated artificially out of the body in different animal media, such as the serum of the blood, and these artificial productions may be inoculated and reproduce the original disease.

How much of this knowledge of facts only comes to confirm our previous knowledge, and how much, is really an addition to it?

First of all, as a means of diagnosis, some observers contend that the characteristic bacilli are always met with in tuberculosis; this, however, is not yet established beyond doubt. But even if it were, it would not carry us much further than we were before. The microscopic characters of tubercle are well known, and there are few cases in which it may not be recognized with the naked eye.

So also with regard to the diagnosis of the disease. It is not very often that the history of a case, coupled with the local chest signs, will leave an experienced practitioner in any doubt as to the nature of the case he has to deal with. So far, therefore, it is in a small number of doubtful cases that the presence of the new bacillus would be important, provided always, that it be established beyond doubt, which is not the case, that the bacillus is the efficient cause of tubercle.

Again, the upholders of this doctrine contend, that these bacilli may be inoculated, but this we already know to be the case with tubercle itself.

The importance of the inoculability of the bacillus, and of its propagation by artificial cultivation, would thus be very much diminished indeed, and we should be thrown back upon the old question of heterogenesis.

Frøedlander says he has produced tuberculosis in guinea-pigs by making them inhale a spray containing the tubercle bacilli, hence it has been hastily concluded that tuberculosis and phthisis was eminently a contagious disease; and from this hasty inference a number of equally unfounded and hasty inferences were as hastily drawn. *

* * *

Common sense and every day experience go but a very little way in this direction. Statistics show that nurses, physicians, and other persons in constant contact with consumptives, are not more liable to the disease than others. And if an individual instance could be of

any value, I might say that for forty years I have been almost in daily contact, for hours together, with consumptive patients.

Besides, whatever may be the fate of the new and important researches, concerning the micro-organisms, as connected with disease, the results of therapeutical practice are independent of them. Just as quinine was found to be an antidote for intermittent fever, centuries before the discovery of the *marsh spirochaeta*, its characteristic bacillus, so I may say at the present day, millions of cases of consumption have been cured by the Hypophosphites, before the discovery of the tubercle bacillus, and will continue to be so, whether the microbe becomes an established fact or not. *Churchill*, 1888.

General Action of Hypophosphites.—The following statement by Churchill as to the *general* action of the Hypophosphites is so comprehensive, and covers indications in so many morbid conditions, that I quote it in this connection:

“The effect of the Hypophosphites on the tubercular constitution depends upon a *general action in the system*, which at a future day will come to be recognized as of still greater importance than their effects in disease. In our present imperfect social state, there is a constant tendency to increased disturbance of the conditions of normal nutrition, which is effectually combated by the use of the Hypophosphites as an occasional and temporary nutriment.

This result can be obtained by no other means hitherto known than the use of some one of the oxidizable phosphorus compounds, the best of which are the Hypophosphites.

By means of these therapeutical agents, the functions of innervation or nerve power, of sanguification or blood-forming process, and of interstitial nutrition, which are the three primordial functions in the animal system, may be kept or gradually raised to the very highest degree of intensity of which the organic conditions of the subject will admit.

Precautions.—The following precautions must always be observed. If tuberculosis depends upon the want of the oxidizable phosphorus in the system, it is clear that the introduction and assimilation of the Hypophosphites will supply this want, but this phosphorus does not exist in the organism in an isolated or free state. It is only one, although the most important and characteristic

among several other principles which unite to make up the phosphide, or oxidizable phosphorized proximate principles. These other elements must be provided by the organism, must combine with the new element medicinally supplied, and the resulting compounds must be built up in the system itself. This is a process of integration which depends, it is true, upon the presence in the system of the elements required, without which it cannot take place, but which is influenced by the activity of other functions, and above all by those of assimilation, respiration and sanguification. Now each of these three different functions may vary, and do vary, in every individual, so that even should the phosphorized element be always supplied in the same quantity, it will not be worked up in all cases with the same amount of activity. It is evident, for instance, that a patient in whom the appetite or digestive function is impaired will take less nutriment, even if he takes the same amount of phosphorus, and consequently build up less of the principles containing the phosphide element, than one in whom the digestive functions are sound. The same will be the case when the lungs are seriously damaged and the respiratory power considerably impaired. Here the activity of sanguification will be diminished, because all the elements of nutrition supplied by the digestive process must first pass through the lungs and be sufficiently oxidized before they become completely incorporated in the blood, and are, so to speak, adopted by the system. It follows from this that the improvement of a consumptive patient under the Hypophosphites should be slow and gradual. The more advanced the disease, the more gradual should be the improvement and the more serious will be the induction of pathogenic symptoms. This last circumstance is the more important, because the existence of a relative state of plethora is the prime condition of cure, but it is also at the same time a predisposing cause of hyperæmia of the lung tissue surrounding the tubercular matter, consequently of inflammation and of softening of the tubercular deposit.

I have often seen cases in which the use of excessive or too prolonged doses of the Hypophosphites has brought on rapid softening of the tubercular deposit and a fatal issue in patients, who shortly before had appeared in a fair way of recovery under the treatment.

When there is any predisposition to hæmorrhage, the action of

the specific should be carefully watched. This, however, is not a counter-indication to the use of the Hypophosphites. It frequently happens, on the contrary, that the tendency to hæmorrhage disappears under their influence, particularly when it depends upon the diathetic and spanhæmic condition, that is, upon the want of plasticity and vitality in the blood. I have published several cases in support of this view, which have since been confirmed by other observers.

As I have seen cases of softening induced by overdoses of the Hypophosphite, so likewise I have either known of, or have witnessed attacks of hæmorrhage, evidently owing to the same cause, or to the concurrent use along with the Hypophosphites of Cod Liver Oil or of Iron; sometimes to the injudicious use, in lieu of the Hypophosphite of Soda, or Lime, to the Hypophosphite of Iron, or even of free Hypophosphorous Acid, given by the physician on account of their greater activity; to the over excitement of the circulation by stimulating liquors; or, lastly, to the use of a heterogeneous jumble of different Hypophosphites; oftentimes, alas! for the poor patient, to a mass of powerful therapeutic agents dished up together.

I remember among many similar cases a consumptive child, nine years of age, who had been ordered to take every day a tablespoonful of Syrup of Hypophosphite of Iron, a large dose of cod liver oil, a powerful tonic and a glass of port wine.

I will now examine successively two different kinds of results which may follow upon the use of the Hypophosphites.

Supposing that the primary condition, that of purity of the remedy, has been secured, I find that when an improvement does take place, the first signs of it usually show themselves more or less during the first week. Sometimes the patient notices it from the very first day. It is seldom delayed beyond a fortnight, though in some exceptional cases I have known it not to become apparent till after the lapse of as long a time as six weeks. You must not, therefore, despair of the remedy if its action be not immediately manifest. Sometimes the improvement is apparent for all the symptoms at once; sometimes only for some; at times for a single one. The appetite is sometimes the first function to improve. At other times it is the strength, or it may be the cough, or sleep, or perhaps fever. The younger the patient, the more limited and the more recent the

disease, the shorter is the time usually required for the first reappearance of improvement.

Narcotics, opiates and sedatives produce a contrary effect to that of the Hypophosphites. They prevent the return of appetite, they bring on or increase weakness and night-sweats. When, as is frequently the case, the patient has been under palliative treatment of this kind for some time previous to his taking the Hypophosphites, the action of the latter will generally be delayed thereby. When narcotics or sedatives have been used for the purpose of allaying harassing cough at night, it will frequently happen that their suppression will be attended with more or less distress to the patient. But it must be persisted in if we wish to obtain the effects of the specific treatment.

Of late years several pharmaceutical preparations have been largely advertised, which consist of a heterogeneous jumble of Hypophosphites, most of which are positively injurious in consumption, as I have before said, and could only be prescribed by a practitioner who understood the matter, if it were wished with deliberate purpose that a patient should only improve for a time and ultimately not get well. These different Hypophosphites are usually associated with strychnia. A mere inspection of them suffices to show that in a pharmaceutical point of view they are utterly ridiculous, if the word monstrous would not be more deservedly applied in a case like this, where the lives of thousands of persons are at stake. It strikes me as wonderful beyond belief that such preparations should by pertinacious quacking have received such acceptance among the profession, and that a medical journal could have proposed that any such as these should be inserted in the British Pharmacopœia.

Not a week passes without my meeting with cases where consumptive patients are going to the bad after a temporary improvement derived from the use of these preparations.

It is thus seen that there exists a number of serious causes of error which should be carefully avoided, as they may easily be, when they are once pointed out. It will occasionally happen that the patient will look upon certain disturbances following the action of the Hypophosphites as unfavorable, and be thus induced to give up the treatment. Such are the following: The morning is usually the

best time to give the Hypophosphite, but in children and in delicate, highly nervous persons, if the remedy be taken in the morning, its stimulating effect will sometimes become apparent during the night, and the patient will complain of restlessness and want of sleep. This will usually be got rid of by changing the hour of administration.

By giving the remedy at bed time absorption and assimilation take place during the night, and its physiogenic effects of increased comfort, strength and activity will then manifest themselves during the day.

Sometimes the patient's appetite increases considerably, but the digestive power, owing to the still deficient supply both in the quantity and the quality of the blood, has not improved in the same ratio. The patient, therefore, complains of increased difficulty of digestion.

This is attributed to the Hypophosphites, and they are struck out. By observing the very simple precaution of keeping at first to the same regimen, and the same amount of food, and only changing and increasing them by slow degrees, this apparently unfavorable effect of the Hypophosphites will be seen to be a result of the efficacy of their action.

Many cases, however, of gastric disturbance noticed by other observers have been undoubtedly due not to this cause, but to the impurity of the salts used.

In the use of these remedies one should never lose sight of the necessity of advancing slowly and gradually along the whole line of improvement. There must be no sudden spurt or burst, and no one function can be stimulated physiologically and usefully to the patient, unless the others are able to follow and keep up with it.

Health is nothing but the equilibrium of all the functions of the system. *Churchill*, 1888.

PHOSPHATES AND HYPOPHOSPHITES.

THEIR DIFFERENT ACTION EXPLAINED.

"The phosphates in the animal economy are probably either the components of fully developed, and, consequently, *stationary* histological elements, or the result of *retrogressive* metamorphosis; they are, therefore, the *residue* of the molecular processes, which constitute the

phenomena of life, and are, so to speak, the *ashes* of the vital furnace. These ashes, which constitute what I propose calling the *phosphatic element*, are in part, if not in the main, produced by the oxidation or combustion of another phosphorus compound existing in the system, and which I propose should be distinguished from the former, by calling it the *phosphide element*. The latter, instead of being a residue or a component of fully grown, and, therefore, already decaying products, is one of the primary principles of all morphotic or germinal elements; it is, therefore, one of the essential conditions of all *pro*-gressive metamorphosis,—perhaps of all vital action.

“This broad distinction between these two biological elements—which had, until my researches upon the subject, almost entirely escaped the notice of physicians, and physiologists—will show at a glance that the views I profess with regard to the nature of tuberculosis, and the action of the *Hypophosphites* are very different from the admitted ideas as to the function of the *phosphates*, to which most persons are continually endeavoring to refer them. In spite of what I have published on the subject for twelve years past, many practitioners still prescribe the phosphates or phosphoric acid, under the idea that they are using my treatment, and occasionally these salts may be found to produce some slight effect from the fact that commercial phosphoric acid almost always contains a certain proportion of oxidizable phosphorus in the form of phosphorous acid.”

Cause of Failure in Treatment.—“In cases where no improvement has shown itself within the lapse of time, I have mentioned (fortnight from time of commencing the Hypophosphite treatment) it will generally be found that this is owing to some one of the following causes:

Along with the Hypophosphites the patient is perhaps taking some other medicine or medicines, which counteract or destroy their effects.

Most of the drugs used against phthisis are altogether incompatible with the Hypophosphites.

For instance, if along with the Hypophosphites, the patient is taking alkalies or mineral waters, there will generally be a persistence or an increase of cough, of expectoration, of night sweats, and of fever.

If preparations of sulphur, or sulphuretted mineral waters are used with the Hypophosphites, there will often, beside these effects, be spitting of blood.

Narcotics, opiates and sedatives also produce a contrary effect to that of the Hypophosphites. They prevent the return of appetite, they bring on or increase night sweats. When, as is frequently the case, the patient has been under palliative treatment of this kind for some time previous to his taking the Hypophosphites, the action of the latter will generally be delayed thereby. When narcotics or sedatives have been used for the purpose of allaying harassing cough at night, it will frequently happen that their suppression will be attended with more or less distress to the patient. But it must be persisted in, if we wish to obtain the effects of the specific (Hypophosphite) treatment.

The same remark applies to the use of the large class of medicines included under the term of tonics, such as bitters, vegetable alkaloids, etc.

The presence in a mixture containing the Hypophosphites, of metallic salts, or of salts with excess of acids, or of free acids, will frequently bring about the decomposition or the oxidation of the salts of phosphorus, and thus modify or altogether destroy their effect." (See remarks concerning the use of arsenic, iron, alcoholic drinks, cod liver oil, etc., page —.)

"Dr. Williams gives a formula in which he prescribes a Hypophosphite along with phosphoric acid. This simply serves to form a phosphate and to set free the hypophosphorous acid, the dangers of which in its uncombined state I have pointed out."

"What Not to Prescribe.—The following, which is a literal copy of a prescription by one of the leading London physicians, is a type of what the practitioner should most carefully *avoid*:

℞	Calcis Hypophos.	- - -	℥ iss.
	Liq. Ferri Pernit.	- - -	℥ iij.
	Liq. Strychniæ,	- - -	℥ j.
	Quiniæ Sulphatis,	- - -	gr. xviii.
	Syrupi Aurantii Floris,	- - -	℥ iss.
	Aquæ Aurantii Floris,	- - -	℥ vj.
	Aquæ Distillatæ,	- - -	℥ xij."

“We thus see that there exist a number of serious causes of error which should be carefully avoided, as they may easily be, when they are once pointed out.”

“Complications.—When death takes place in cases treated by the Hypophosphites, it is due either to the pre-existing lesions, or to the occurrence of some secondary or accidental complication.

In no case after the employment of the Hypophosphites is death brought about by new tubercular deposit, unless the treatment is completely stopped while the patient is still exposed to the causes which produce tuberculosis.” *Churchill.*

Iron.—“Iron and all its preparations should be most rigorously excluded, * * * except in some rare and exceptional cases.”

Arsenic and Metallic Salts.—“Arsenic, which is frequently prescribed against phthisis, almost entirely destroys the beneficial action of the Hypophosphites. The same remark applies to all metallic salts in general.

Alcoholic Drinks.—All alcoholic stimulants, strong wines, and beer, which are so often prescribed in cases of consumption, produce similar effects. They prevent the return of strength, and bring on a recurrence or an aggravation of cough, fever and sleeplessness.

As their effect upon the system consists in a stimulation of the circulation and a diminution of oxidation, it is directly contrary to that of the Hypophosphites.

Their use is to be more especially deprecated whenever there is any acceleration of the circulation, either owing to hectic fever, or to intercurrent inflammation, whether this latter be accidental or dependent upon softening of the tubercular matter.

The patient must be restricted to the use, at most, of very weak claret and water; but it is even better to avoid fermented liquors altogether, and confine him to tea, coffee, milk, and slops of any kind.

Cod Liver Oil produces a somewhat similar effect to that of alcoholic stimulants. It disturbs digestion, interferes with the appetite; by its local action on the lungs it hinders the elimination of tubercular matter, favors the fatty degenerescence of tissue, to which the patient is already prone; diminishes oxidation, thus increasing, without any beneficial effect, the plethora, which the Hypophos-

phites themselves already tend to produce, and in this way frequently brings on formidable attacks of hæmorrhage." *Churchill*.

"Having now been in the habit of using the Hypophosphites pretty frequently during the past five years (1863 to 1868), I am able to say that my faith in their remedial power becomes more and more confirmed, while I recognize the fact that they require to be given with discrimination and care; otherwise, not only no benefit, but actual mischief, will result from their administration." *Dr. Thorowgood*, 1868.

In pthisis, Dr. Churchill recommends the Hypophosphites of Soda, Lime, and Quinine only. "I have investigated experimentally the action of a great number of Hypophosphites. * * * I found that in the treatment of pthisis the Hypophosphites of Lime, Soda, and Quinine should alone be used."

Speaking of Hypophosphite of Potassium, Dr. Thorowgood says: "As a remedy I do not often employ it; it must be used with great caution, being a powerful resolvent 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."

Upon the same subject, Dr. Churchill says that it "usually produces an increase of expectoration, and symptoms indicating more active disintegration of the tubercular deposit. These phenomena are in accordance with the facts already known respecting the eliminative action of this base."

Since my discovery of their curative effects, I have had constant opportunity of observing their action in delicate children, born of consumptive parents, and I feel bound to state that I have never seen *one* single instance of such children becoming consumptive, when the remedy has been used in a proper manner.

"Independently of this fact, I have demonstrated experimentally that the Hypophosphites exert a special action in promoting the growth of children and young animals, and thus show themselves to be the direct antithesis of that peculiar condition of weakness and low vitality, which is one of the characteristic morbid features of the present physical constitution of most classes of the population."

Dangers of Salts of Potash and Ammonia.—"The salts of potash and ammonia are possessed of a special eliminative

action. * * * This explains why some practitioners, * * * by the injudicious use of them in consumption, have seen the disease all the more rapidly run its course to a fatal termination."

Danger of Combinations.—"For the same reason most of the uselessly complex formulas, * * * containing a jumble of Hypophosphites of different basis, are evidently likely to do as much harm as good." *Churchill.*

Permanency of Cure.—"From what I have seen of patients whom I have treated three or four years ago, 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 patients when actually under treatment, and have questioned them as to their own recollection of their past symptoms." *Thorowgood.*

Inheritance in Young Persons.—"It must always be recollected, in the practical use of the Hypophosphites, that this 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. 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. Very often I have seen active consumption in its third stage arrested by Hypophosphite of Lime, cavities existing becoming quiescent for months, or even years, and the general health improving greatly." *Thorowgood.*

Shortness of Breath.—"A phenomena often noticed and often referred to in these cases ('Consumption and Hypophosphites,' page 40, 2d Ed., London, 1868,) by the patients, in their great breathlessness; they feel well, they say, 'but for breath.' This harassing dyspnoea I have now recognized as one of the phenomena of phthisical

convalescence, when the destruction of lung tissue has been extensive." *Thorowgood.*

In Treating Phthisis:—

“First.—*Use chemically pure salts only.*

Second.—Administer them as indicated. *One salt at a time. Do not combine.*

Third.—Administer the Hypophosphite so as *slowly* to produce their physiogenic effects, and carefully watch that the action of the remedy does not enter the sphere of pathogenic phenomena. Should this occur, at once discontinue the remedy, and, after a few days, continue the medication in reduced doses.

Fourth.—Keep the patient under the physiogenic action of the remedy as long as may be necessary to obtain the elimination of the morbid deposit in the lung.

Fifth.—Combat by appropriate means the consecutive or accidental complications which exist or may show themselves during that time.

Sixth.—Confine the doses between one and seven grains per day. “Originally, I was in the habit of prescribing for men from five to fifteen grains daily. Longer experience has led me to reduce the dose. Instead of beginning with five grains a day and gradually increasing up to fifteen, I now usually begin with one grain a day, and seldom go beyond six or seven.” *Churchill.* (See also remarks by Dr. L. De Bremon, page —, this pamphlet.)

“When the local lesions have disappeared, or have cicatrized, the patient should continue to take one or two doses a week as a prophylactic.

The main principle to be followed is to keep the remedy within the physiogenic sphere of its action; to leave it off for a time if there should be any pathogenic effects; but in *no case, on that account, to abandon it altogether.*

CLASSIFICATION BY STAGES.

First, or crude stage.—Characterized by a modification of the percussion or auscultatory sounds, without the production of any abnormal signs.

Second, or period of softening.—By the presence of abnormal crepitus in lieu of the physiological respiratory murmur.

Third, or period of excavation.—By the existence of cavernous rales and sounds.

GRADUATED SCALE OF LESIONS.

First.—The diathesis with little or no deposit.

Second.—Confirmed deposit confined to a portion of one lung, and in the first stage.

Third.—Deposit in the second stage in one lung.

Fourth.—Deposit in the first stage in both lungs.

Fifth.—Deposit in the first stage in one lung, and in the second in the other.

Sixth.—Deposit in the second stage in both lungs.

Seventh.—The third stage; excavation, with only one lung affected.

Eighth.—Both lungs affected; one in the third, the other only in the first stage.

Ninth.—One lung in the third stage, one in the second.

Tenth.—The third stage in both lungs.

Eleventh.—Complications, such as diarrhœa, laryngitis, etc.

PHYSIOGENIC EFFECTS OF THE HYPOPHOSPHITES.

Nervous Energy.—One of the first effects produced by the Hypophosphites is a general increase of nervous energy, with an unusual feeling of ease and comfort.

Appetite.—The second effect is an increase of appetite, which sometimes becomes enormous; as a natural consequence of this fact, digestion is much improved, and the bowels also become more regular in their action.

Hæmatisis.—These phenomena are soon followed by increased activity of hæmatisis; * * * both the quantity and color of the blood are so rapidly increased that the Hypophosphites are undoubtedly the most powerful hæmatogens hitherto known.

Venous Plethora.—After a time, which varies with the constitution of the patient, and the doses given, there are evident signs of venous plethora, as shown in the color of the face, the redness of the mucous membrane of the lips and eyes, and the fullness of the superficial veins.

Sometimes this effect is so strongly marked that the persons who all their life-time have looked pale and delicate, put on the appearance of full and robust health.

When this stage has been fully reached, if blood be withdrawn from the patient, or be lost by accidental hæmorrhage, it will be found much darker than the natural state; so much so that the patient's attention is usually struck with this appearance. The same character is observed in the menstruation, which becomes easier, more abundant, and more regular.

Weight.—The patient *generally* gains in weight.

Growth.—If the subject be young, growth is notably excited, and children while taking the Hypophosphites, never show the signs of weakness and emaciation to which they are otherwise prone after too rapid development.

Teething of Children.—In the first teething of children, the Hypophosphite of Lime produces an *heroic* effect, and, if properly used, will act as a preservative against all the accidents of this difficult period of life.

PATHOGENIC EFFECTS.

Lassitude, Prostration.—When the Hypophosphites have been taken too long, or in too large doses, the first pathogenic effects generally show themselves in the nervous system.

Patients, who up to that time had felt a gradual or permanent increase of strength, begin to complain of weakness, perhaps of a feeling of lassitude, of vague or wandering pains in the limbs, of somnolence.

Sometimes lassitude may be carried as far as complete prostration.

Headache, Giddiness, Fever.—If allowed to proceed, it may be followed by headache or giddiness, disturbance of the eyesight, noises in the ears, and fever may finally supervene.

Indigestion, Loss of Appetite.—Digestive function is equally disturbed; appetite, before increased, may fall away or be lost.

Colic or Diarrhœa.—There may be colic or diarrhœa.

Hæmatosis.—All these signs which point to some disturbance of the nervous system, seem to be directly connected with an exag-

geration of the function of hæmatisation, and are accompanied or preceded by disturbance of the circulation. The breathing may become short and uneasy, there are pains in the chest, an aggravation of the cough and expectoration, and at this period auscultation frequently shows increase of the local signs, consequent upon augmented hyperæmia of the lungs. If, in spite of these symptoms, the use of the remedy is persevered in, hæmorrhage takes place from the respiratory or the digestive mucous membrane.

Epistaxis and Hæmoptysis.—This generally makes its appearance in the shape of epistaxis, after which there may be an attack of hæmoptysis.

Intestinal Congestion or Hæmorrhage.—Some patients, after being kept a certain length of time in this pathogenic condition, find that they are affected with hæmorrhoids for the first time, or that those which they formerly had, and which had disappeared, are reproduced. This may even go to the extent of real intestinal hæmorrhage.

Diet.—With regard to the patient's diet it will not be found necessary, while he is taking the Hypophosphites, to prescribe or to forbid any special kind of food, provided the digestive powers be unimpaired; otherwise it may become necessary to order some special regimen.

I find it far better to stimulate the patient's appetite by the variety of his diet."

Purity of the Remedy.—The *purity of these salts is an absolute necessity*, as their medicinal activity is very much lessened, and in many cases entirely prevented, by the impurities always found in the commercial salts and the preparations made from them.

Upon this point Churchill observes: "When I stated years ago that the non-success of some practitioners in the treatment of phthisis with the Hypophosphites was owing to their impurity, I only expressed the conclusion to which I had been led by experimental investigation.

I had found by repeated clinical experiments that, when a certain proportion of alkaline carbonates was added to the pure Hypophosphites, the physiological and therapeutical effects were manifested but slowly and incompletely, or failed altogether."

NOTE.—This proves how fallacious is the claim of those who openly advertise as an *advantage* that their compounds have an *alkaline reaction*.

R. W. G.

"All physicians who have employed the Hypophosphites with success have pointed out the absolute necessity of employing them absolutely pure." *London Lancet.*

"I found the commercial Hypophosphite of Lime, as sold by the trade, to contain phosphite, phosphate, or carbonate." *Jansen, Repertoire de Clinic.*

"The Hypophosphite of Soda and Lime *must be perfectly pure*; this is one reason of the advantageous results attained by me. In the treatment of phthisis, the Hypophosphites must be used alone and without any other drug, unless we wish to destroy their effect." *Dr. Maestre, Prof. Clin. Med., Univ. Granada, Spain.*

"At least one-half of the failures in the use of Hypophosphites are owing to no other cause than their administration in combination with Cod Liver Oil." *Churchill.*

"I must say that I have only been completely successful when I was certain that the remedy was perfectly pure." *Dr. Parrigot, Prof. Univ. Brussels.*

"The Hypophosphites used by me were perfectly pure; and this is absolutely essential to success in their administration." *Dr. J. C. Thorowgood, M. R. C. P., London, and Phys. to London Hosp. for Diseases of Chest.*

"All observers are now agreed that the remedies discovered by Dr. Churchill, have a special physiogenic action upon the system. I must confirm what has been stated by Dr. Churchill as to the absolute necessity of the Hypophosphites being perfectly pure."—"Trattamento delle Malattie del Petto col mezzo degl' Ipofosfiti, per il Dottor J. F. Churchill." *Dr. Fedeli, Rome, Italy.*

"I would wish to warn practitioners against the use of any drug whatsoever along with the Hypophosphites, unless it be for the express purpose of fulfilling some temporary and well defined indication.

Many cases of gastric disturbance, noticed by other observers, have been undoubtedly due to the impurity of the salts used.

The point of primary importance in the use of the Hypophosphites is their *chemical purity*." *Churchill.*

"Above all things, it is necessary that the medicine should be perfectly pure; so, I beg my brethren, before prescribing any salt

of the Hypophosphite, no matter what, to assure themselves of its purity." *L. DeBremont*, M. D., page 86.

"The Hypophosphites easily attract moisture from the atmosphere, and then combine with its oxygen, and are first transformed into a phosphite, and afterwards into a phosphate.

This is the reason why *no reliance* can be placed upon the hypophosphites as therapeutical agents, when kept for any length of time in the *state of salts*, and *still less* in solution." *Churchill*.

Preparations of Hypophosphites of Lime and Soda used by Dr. Churchill. "Are *always in the form of Syrups*, made from the recently prepared salt, chemically pure."

NOTE—These are also separate Syrups, viz.: Syrup of Hypophosphite of Lime and Syrup of Hypophosphite of Soda. R. W. G.

INDICATIONS OF THE DIFFERENT HYPOPHOSPHITE SALTS.

Hypophosphites of Soda and Lime contrasted.—"Their therapeutical action is very similar; but the soda salt is rather the less active; the Hypophosphite of Lime appears also to have a more direct effect on the expectoration, which it sometimes diminishes somewhat too rapidly, thereby causing an increase of cough. In that case it should be replaced by the salt of soda.

The lime salt should usually be preferred when there is diarrhoea, as also for children and pregnant women.

Hypophosphite of Quinia.—I have found the Hypophosphite of Quinia useful in the *incipient* diarrhoea of phthisis, in that of young children, and occasionally to modify the nature of the expectoration.

It is useful when the other salts may be found too active.

The quinine salt * * contains the smallest proportion of the active phosphide element.

This is one of the reasons why it will frequently be found useful in cases of intercurrent inflammation, and other complications when the more powerful combinations (lime or soda) are found to be too active and stimulating, and why it should often be preferred, at least in the beginning of the treatment, for certain cases, such as very advanced phthisis, when the action is required to be small and slow.

Hypophosphite of Iron.—In the first edition of my work on consumption, I stated that the action of the Hypophosphite of Iron should only be tried with great caution in cases of consumption, as in several for which I had prescribed ferruginous preparations simultaneously with the Hypophosphite, their exhibition appeared to be followed by hæmoptysis or hæmorrhage in some shape or other. I also remarked that the association of iron with hypophosphorous acid appeared to me to be unlikely to prove of much utility as an anti-tuberculous medicine, because a sufficient quantity of iron to saturate the ordinary dose of acid would probably be dangerous, and could certainly not be given continuously without accident. Subsequent experience has since fully confirmed these views. Not only was hæmorrhage produced in almost every instance in which I used the Hypophosphite of Iron, but in patients who have been previously taking ferruginous medicines, it will be found that it is very difficult at first, to keep the effects of the Hypophosphites within the limits of their physiogenic action.

But in cases of chlorosis and anæmia, as also of general debility, in female diseases, and in certain nervous disturbances it will be found far superior to all other ferruginous compounds.

Hypophosphite of Manganese.—Hypophosphite of Manganese acts in the same manner, but with much less energy. It has a special excitatory action upon the biliary secretion, and I have found it peculiarly useful, either alone or in conjunction with Hypophosphite of Quinine, in hepatic derangement, with deficient biliary secretion, subsequent upon prolonged residence in tropical climates, as also in cases of anæmia and general debility depending upon the same cause.

Phosphorus and the Hypophosphites Compared.—A dose of one grain of phosphorus in whatever menstruum (be it oil, ether, fat, resin or anything else) is a dangerous quantity, and if it should be taken once or twice with impunity, would, if repeated, kill the patient in a very few days.

Ten grains of the Hypophosphites of Lime or Soda, which are equivalent to respectively *three* and four grains of phosphorus, may be taken, not only without danger, but with evident advantage (*when there is no organic lesion*), for a considerable time, and doses of *forty-five grains of pure Hypophosphite of Soda*, prepared by my-

self, equivalent to *eighteen grains* of phosphorus, have been given by me without any deleterious effects.

The too prevalent idea that phthisis, *if curable by the Hypophosphites*, is to be cured by *any* of these salts, given in *any* dose or at *any* time, shows the low state of medicine as compared with that of really exact sciences.

Prognosis.—If ten consumptives be selected in such a state that there can be no doubt of the certainty of the diagnosis, and at such a stage of the disease that the pulmonary lesions shall be as little advanced as is compatible with such certainty, it is undeniable that no physician would pledge himself to cure a fixed proportion of them, or even any one single case selected beforehand, if he be debarred from the use of the Hypophosphites, or of some oxidizable compound of phosphorus.

With every other resource at his command, the utmost he could do would be to promise that the life of some of them might be prolonged; that one, or at most, two, might possibly escape, but without being able to tell who would be the fortunate exception, or who would prove victims to the disease.

On the other hand, if any number of patients be taken in the conditions above indicated and subjected to the use of the Hypophosphites *properly given*, nine out of ten of them ought to recover, the tenth case being allowed for errors of observation. So that the prognosis of a given case of phthisis, either treated by the ordinary means exclusive of the Hypophosphites, or left to the course of nature, depends not on the state of the patient, but on the *nature* of the disease itself, and is nearly always fatal; while the prognosis of the same disease under treatment by the Hypophosphites is *independent of the diathesis* or constitutional cause, and rests altogether on the extent of the pre-existing lesions, that is, on the destruction of lung tissue already produced, or on the presence or absence of complications.

Complications.—I now come to a very important point—that which relates to the influence which the existence or non-existence of complications exerts on the cure of phthisis by the Hypophosphites.

The complications of consumption are of two kinds; some are secondary or tertiary consequences of the disease itself and are

nearly sure to appear at certain stages of its development. Such are hæmoptysis, diarrhœa, amenorrhœa, vomiting, fatty degeneration of the liver, disease of the kidneys, etc.

Others are distinct diseases, co-existing with the principal complaint. Such are accidental intercurrent inflammation of the different parts of the respiratory apparatus, bronchitis, pleurisy, pneumonia, laryngitis. The first kind of complications may be called consecutive; the second, accidental.

Œdema.—Of the extremities, when not dependent on an accompanying affection of the heart, is always a very serious symptom in relation to phthisis, since it indicates the existence of a considerable mechanical obstacle to the circulation, due either to the extent of the lesion in the lungs, to fatty degeneration of the liver, to disease of the kidneys, or to embolic disease of the veins, and is usually indicative of a speedy, fatal termination. In four cases, however, I have seen the patients recover after well marked œdema.

Aphthæ, or Diphtheria.—Which are pathognomonic of a general failure of the nutritive function, are a still more fatal symptom than œdema.

Hæmoptysis.—In the prognosis of hæmoptysis a distinction should be drawn between the result of a given attack and that which depends on the hæmorrhagic tendency of a patient. The first varies with a number of circumstances which it would be too long to investigate here. The second case, namely: The existence of the hæmorrhagic predisposition, will render the prognosis less favorable than it might otherwise be, for two reasons: First, because the patient may be suddenly cut off by hæmorrhage, and next, because there will be need of greater caution in the use of the Hypophosphites.

Pyrogallic Acid in Hæmoptysis.—Since this was first written, in the year 1863, I have found a perfect specific for the arrest of hæmoptysis. This is pyrogallic acid, chemically pure, given either in one grain pills repeated every hour, or above all, administered as a spray in a solution of two grains to the ounce and repeated as occasion requires from time to time. Since 1863, that is for upwards of ten years, I have only lost two patients by hæmoptysis, while before that period I had the misfortune to lose several every year.

Vomiting.—Vomiting may depend upon two causes. At the beginning of the disease it is usually produced by the intensity of the cough and does not modify the prognosis, since, when this is favorable in other respects, the vomiting almost always disappears on the patient's improving, and no necessity exists for any special treatment.

When, however, the vomiting depends on the state of the digestive organs, the prognosis is less favorable, as it must be based not upon the simple existence of the symptom, but upon the whole morbid series, of which it is only one sign.

These vomitings usually produce great weakness, because they directly interfere with nutrition, and have been heretofore looked upon by pathologists of the anatomical school as dependent upon softening of the mucous membrane of the stomach. This is an error which I pointed out many years ago. The softening found on post-mortem examination in cases of this kind is an effect of cadaverous decomposition.

The vomiting is always proportionate to the violence and frequency of the cough, and disappears as soon as the latter is reduced to its *minimum* by the action of the Hypophosphites.

In some few cases, however, vomiting, or rather *nausea*, seems to be connected with renal or uterine complication.

Fever and Night Sweats.—Hectic fever and nocturnal ephidrosis are generally a consequence of the purulent resorption which takes place in the lung tissue. If the disease is recent, both symptoms usually disappear by the aid of the Hypophosphites alone, because they depend either upon the resorption of tubercular matter, or upon the general debility of the patient. When the disease is more advanced, when the tissues of the lung are deeply disorganized, and purulent secretion is fully established, perhaps by the formation of a pyogenic membrane, this result cannot be obtained, or can only be obtained very slowly by the Hypophosphites.

Diarrhœa.—Diarrhœa at the beginning or in the course of the disease, and not depending on ulceration of the intestines, nearly always yields to the action of the specific (Hypophosphite) alone, as is mostly the case in children, or to appropriate adjuvant remedies; it, therefore, calls for no modification of the prognosis. Yet, as this

is a point which is often very difficult to decide, the prognosis in such instances depends chiefly on the intensity, and the persistence of the complication, whatever be its cause, since this always produces a disturbance of nutrition.

When diarrhœa is present, the prognosis ought, therefore, to be given with great reserve, until we are sure of being able to combat it successfully.

Colliquative Diarrhœa is only one of the numerous symptoms of organic lesions involving nearly every part of the body, and is necessarily fatal. I have, however, more than once been called in consultation to a case of phthisis with colliquative diarrhœa, and all the concomitant symptoms of an expiring patient, and have been told by the attending physician that he thought it an *excellent opportunity for trying the effect of the Hypophosphites*.

Fatty Degenerescence of the Liver, when it has reached a certain extent, is also an unfavorable symptom, though I think it has not the importance which some pathologists have assigned to it.

Laryngitis.—The prognosis of phthisis complicated with *laryngitis* under ordinary treatment, is, as is well known, almost always fatal. Of all the complications of phthisis, this is perhaps the most formidable, and tubercular laryngitis has hitherto been looked upon as absolutely incurable. It was observed in ten patients out of seventy-nine. (Cases subsequently cited, page 60.)

There were four confirmatory (continued improvement during whole time of treatment) results, of which two were cures, and six negative results, including three deaths. In my *private* practice, the results with the Hypophosphites have been more favorable than this.

Amenorrhœa, which shows itself at the beginning of phthisis, not yet under the specific (Hypophosphite) treatment, is usually not of much importance, as it may then depend on the general condition, and on imperfect hæmatisis.

When it appears in the course of the specific (Hypophosphite) treatment, it may be produced by different causes, such as the breaking down of the pre-existing tubercular deposit, or intercurrent inflammation.

In such cases, it is always a bad sign, though not necessarily fatal.

THERAPEUTICAL EFFECTS OF THE HYPOPHOSPHITE TREATMENT, NOTED BY DR. CHURCHILL, IN SEVENTY-NINE PATIENTS IN THE SECOND STAGE OF PHTHISIS, TREATED AT HIS PUBLIC DISPENSARY, RUE LARREY, IN PARIS, DURING THE YEAR FROM DEC. 2, 1857, TO DEC. 2, 1858.

Fever.—Forty-four patients suffered from fever. In 24, the fever diminished; in 37, it disappeared, but only permanently in 16. Total number of cases influenced, 41 out of 44.

Night Sweats.—Night sweats were noted in 56 cases. They diminished in 9 and ceased in 44; but for 11 of these only for a time. For three patients the record is incomplete. Total number of cases influenced, 53 out of 56.

Loss of Appetite.—Fifty-two patients had lost their appetite. Improvement in 11 cases; complete return of appetite in 39 cases, which for seven of these was only temporary; record incomplete for two cases. Total number of cases influenced, 50 out of 52.

Vomiting.—Twenty-one patients complained of vomiting. Four improved; in 13 it disappeared, but afterwards returned for five out of that number, in one case the result was not noted. Total number of cases influenced, 17 out of 21.

Sleeplessness.—Thirty-six patients complained of want of sleep. In 15 cases there was an improvement; 17 cases recovered sound sleep, but 3 of these only for a time; for 4 cases the record is incomplete. Total number of cases influenced, 32 out of 36.

Dyspnœa.—Seventy patients complained of shortness of breath. In 25, the breathing improved; 38 recovered their natural wind, in 1 case this was only temporary; in 5 more cases the change was not noted. Total number of cases influenced, 63 out of 70.

Cough.—All the 79 patients had cough, there was an improvement in 43 cases; in 31 it ceased altogether, but in one of these afterwards returned; in one case the result is not stated. Total number of cases influenced, 74 out of 79.

Expectoration.—Expectoration was noted in 76 patients. There was an improvement in 39; it ceased altogether in 27, but in 5

of these afterwards returned; in 1 case no record of change was made. Total number of cases influenced, 66 out of 76.

Diarrhœa.—Ten patients were suffering from diarrhœa. It ceased in 8 cases. Total number of cases influenced, 8 out of 10.

Meustruation.—Dysmenorrhœa was noted in 6 cases. Two patients improved; in the four other cases the function was restored to its normal state, but for two of these only for a time. Total number of cases influenced, 6 out of 6.

Amenorrhœa.—Existed in eight cases, and in six the function was restored. Total number of cases influenced, 6 out of 8.

Strength.—As far as muscular power is concerned, 48 patients had been obliged to leave off work altogether; 27 were able to return to their occupations, but 4 only for a time. Total number of cases influenced, 27 out of 48.

The above is a summary of the symptomatic modifications produced by the use of the Hypophosphites.

Modifications of Symptoms Under Treatment.—In nearly every case, one or several of the morbid phenomena were diminished or modified, at least for a time, so that there was at least an improvement, even if only temporary, in almost every case.

The changes produced by the treatment in the percussion and auscultatory sounds may be of three different kinds; there may be a complete disappearance of the morbid sounds; there may be simply a decrease, or there may be a passage from one kind of morbid sound to another after an aggravation of greater or less duration.

In many cases the local signs which are pathognomonic of tuberculosis in the second degree, may disappear completely without leaving any trace behind, which authorizes the conclusion that this has been effected by resolution and absorption of the tubercular matter. Until my discovery of the Hypophosphites, this mode of cure had been observed so rarely in consumptives arrived at the period of softening, that most pathologists either denied or doubted its possibility. But there can be no doubt of the fact for those who have seen the curative action of the Hypophosphites. Out of the 79 cases to which reference has already been made, this occurred for 16 cases. But I have since then observed this result in thousands of instances. It will be found to have occurred in 7 of the 20 cases in

the third stage observed by myself, and which are given in Appendix III., Cases 1-24 (*Churchill's Work, 1875*).

In these cases one lung was in the third stage, and the other in the second stage; the latter organ was entirely restored to health. A similar result will be found in several of those which have been published by other observers, and which are given in the same appendix.

Sometimes, although recovery takes place, a portion of the lung, which had been the seat of the disease, remains indurated or consolidated.

There is probably either encystment, cretification, or incomplete elimination of the tubercular matter, or the lung tissues have permanently consolidated and indurated.

This result was noted in 6 cases of the 79 already referred to.

In another class of cases recovery only takes place after complete softening of the morbid deposit, with ulceration of the lung tissue involved, and the formation of an excavation. This occurred for 4 cases in the series of 79.

But in Appendix III. (*Churchill's Work*), will be found another series of twenty cases of the same kind, collected from my private practice, in the course of little more than two years of my first use of the Hypophosphites in Paris.

Although this mode of cure in consumption had been occasionally noted previously to the use of the Hypophosphites, it was of such rare occurrence that very few practitioners had been able to observe more than one or two cases in a long series of years.

With the use of the Hypophosphites this mode of termination is one of frequent occurrence. I am probably under the mark in saying that I have now observed *several hundred cases of this kind*. But in instances terminating in this way, as also in the preceding one by induration, the final condition of the patient may vary in different cases. In some there will be no general symptoms at all left, not even shortness of breath; the patient will be able to undergo as much, or nearly as much, exertion and fatigue as before. There may be no cough, no expectoration, and the patient may enjoy robust health, while even here, the pectoriloquy and cavernous breathing will give undeniable proof of the existence of a cicatrized excavation.

Condition of Cure.—In other instances the lung tissue, which has not been destroyed, may not have been so completely restored to its normal condition, or the cavity may be more extensive than in the former case; and then, although the arrest of the original disease may be as complete as in the former instance, though the tubercular diathesis—the *fons et origo mali*—may have entirely disappeared—though there may be no tendency to its recurrence, and consequently to a relapse, the patient's health may not be so completely restored as in the first instance, and may present every intermediate shade of difference between perfect ease and comfort, except during violent exertion, and a very unstable degree of well doing, where the amount of vital and organic activity remains very low, and where the patient is a sufferer from every external variation, and where the lungs are in a constant state of accidental congestion or inflammation. This state of things will be more or less strongly marked, according to the amount of lung tissue, which has been destroyed, or more or less damaged by the disease.

It will generally be found gradually to improve with proper care, and, above all, the avoidance of cold and exposure, particularly if the patient winters in a warm climate. This progressive condition usually lasts for two or three years, at the end of which period only, the patient may be said to have reached the full improvement of which his condition is susceptible.

Conditions of These Results.—The question now occurs, when are these several results obtained by the use of the Hypophosphites? Is it merely by chance—that is, owing to some undetermined cause—as in the cases of cure obtained by other means? No. It is in every case, *where the remedy is properly used*, and where the patients at the beginning of the treatment are in such a pathological condition that a cure is still possible.

What these conditions are has been already explained, and there is no undue assumption in saying that *the prognosis of no disease has hitherto been established upon a more accurate basis.*

I have shown that the primary condition for a cure depends upon the *extent of the tubercular deposit.* The second condition is the *degree of evolution which that deposit has already reached.* When that has not passed the *second degree*, and the disease is limited to *one lung*, a favor-

able prognosis may be laid down with almost *mathematical certainty*.

A third condition is the acute or chronic type of the complaint.

As regards the type of the disease, *i. e.*, its more or less rapid progress, the prognosis depends on the fact that the Hypophosphites have a specific antagonistic effect on the development of the disease.

The more rapid the progress, the more serious, *other things being equal*, will be the prognosis, since the greater in a given time will be the extent of the lesion.

An amount of disorganization, which in ordinary cases would have required several months, sometimes in an acute case takes place in an equal number of days. Still, the principle already laid down, *viz.*, that it is the extent of the lesion, which determines the prognosis, applies as correctly to acute phthisis as it does to chronic. The acuteness of the disease, that is, the intensity of the general symptoms, has no influence on the efficacy of the treatment, *and this is a result of which no other treatment offers a single example*; for I am not aware that there is a single case of recovery from acute phthisis on record. I had, up to the year 1862, obtained this result in six instances, by the use of Hypophosphites, and since then have observed a number of others."

NOTE.—Dr. Churchill here draws a distinction between acute softening and acute tuberculization. Hitherto, this distinction would have been of no importance, but becomes of the greatest value if the Hypophosphites are the remedy for the latter, but not the former.

R. W. G.

A fourth and last series of conditions depends upon the existence or non-existence of complications. In a word, the prognosis of a case of phthisis, when subjected to the *rational use of the specific treatment* (chemically pure Hypophosphites, exhibited as separate salts, in accord with his suggestions), depends almost entirely on the pathological state existing at that moment, and a cure may be expected in all cases where the organic disease is not already sufficient to produce death, either directly by itself, or by the consecutive disturbance caused by its natural evolution. These are the limits of all real science, because all real science can only be conditional. To ask for more would be absurd, to pretend to do more would be an imposture.

Necessity of Accurate Auscultation.—The importance of accurately determining the site, the extent and the degree of the

local lesion, in order to find a sure basis for prognosis, requires that a new view should be taken of the local diagnosis.

The full value of accurate auscultation now becomes apparent, and practitioners for the future, instead of simply auscultating a patient for the mere purpose of deciding whether he is or is not consumptive, must examine him with the same attention and minuteness as in a case of pneumonia, or pleurisy, or heart disease. Without the resource of the Hypophosphites, it is a matter of small moment to the patient and his friends to determine whether one or both lungs be involved, whether the deposit occupies a large or a small portion of these organs. The final result will in all cases be pretty much the same, and is merely a matter of time.

It often happens that in examining a case of phthisis the auscultator will diagnose the tubercular deposit as extending no further than where the lung gives signs of softening, while in reality, a much more considerable portion may be invaded by tubercles in the crude state to such a degree that the respiratory process going on is barely sufficient to maintain life, as shown by the amount of dyspnoea. This latest deposit of tubercular matter may sometimes be so far advanced that it must necessarily go on to softening, or this process may be set up by the slightest amount of intercurrent inflammation. Not only therefore must the examination of the chest be made with all the care and accuracy the practitioner is capable of, but his diagnosis of the extent of involved lung must be based not upon the physical signs alone, but also upon all the rational symptoms which can throw any light upon the subject. As in the diagnosis of the nature of the disease itself, so also in that of the amount of physical lesion, the only sure basis is the concordance of both the physical and the rational phenomena. It may sometimes happen that even an experienced and skillful physician, by taking account exclusively of the auscultatory signs, will think the local mischief is but slight, when it may already be very serious indeed—perhaps even hopeless. This will generally be indicated by the want of that proportion and concordance between the local signs and the intensity of the general symptoms, and, above all, the amount of difficulty of breathing which I have just mentioned. This is particularly applicable to cases of rapid tubercularization.

I have seen several cases of consumption where the most eminent auscultators have neglected accurately to state the extent of the local lesions in their diagnosis, even when given in writing.

Two such cases will be found fully reported at pages 620 and 621 of my French work (*De la cause immediate de la Phthisie, etc.*, Paris, 1864).

The subject of the first of these cases was a Russian Prince, who is now living, and has been in the enjoyment of perfect health for upwards of fifteen years, thanks to the use of the Hypophosphites, and who, the day before he was placed under my care, had been examined by three of the most eminent physicians and auscultators, I may say not only in Paris, but in the whole world. There is not an auscultator of any fame in this country, who, like myself, has not sat at their feet, or at those of their disciples. One gave as his diagnosis—"softened tubercles at left apex;" another, "softened tubercles at right apex;" while the third stated, "softened tubercles at both apices." On examination, I found these three statements were all correct, and that, moreover, there were a certain number of tubercles disseminated throughout both lungs. Now, what was the cause of these discrepancies? Simply that these gentlemen thought it sufficient to establish the nature of the complaint, that neither of them supposed there could, at this stage, be any doubt as to the ultimate prognosis, and the two first deemed it useless to alarm the family any more than was absolutely necessary. The discovery of the specific of phthisis now enables the practitioner to make the fullest use of Laennec's wonderful invention and to lay down the prognosis of tubercular disease with an accuracy inferior to that of no other branch of medicine, or even of surgery itself.

Apparent Aggravation.—The reader must not suppose that the results above described are attained smoothly and uniformly in all cases; sometimes, as already mentioned, it is only after a temporary aggravation of the auscultatory signs that the lung is freed from the tubercular deposit. In these cases these signs will be often found to undergo a gradual and progressive transformation from above downwards, as if the lung were composed of different layers of diseased tissue exactly in the same order as we know the tubercular matter itself is deposited. For instance, moist or dry crepitus apex; lower

down there may be dullness on percussion, and as yet nothing more than pleuritic, or bronchial, or diminished respiration. The crepitus may disappear at the apex, be succeeded by natural breathing, and then be found lower down, where previously there were no signs of softening.

These in their turn may also disappear and again be reproduced for a while in a lower portion of the lung, so that for a time there may appear to be a local aggravation of the disease, although the patient is really on the high road to recovery.

The circumstances which appear most to favor a cure by resolution are the recentness of the deposit, the incipiency of softening, the freedom during the treatment from accidental intercurrent bronchitis, lastly, the youth of the patient. This last condition agrees with the well known fact that cavities are of a rare occurrence in young children.

When these conditions do not exist the softening of the deposit must go on, and a cure can only take place after the formation of a cavity.

Relapse.—What is the final value of the result obtained in a case of phthisis, when the lung has been completely healed, or when it has become cicatrized by the use of Hypophosphites? Is the patient safe, or is he at any time subject to a relapse? Several hundreds of patients who have been cured by me in the first or second stage by the process of absorption or elimination of the tubercular matter, and whom I have had an opportunity of examining since their recovery, have remained in perfect health by means of the occasional use of the Hypophosphites in prophylactic doses.

Of the patients who had only recovered with the persistence of a greater or less amount of disorganization in the lung tissue, all those who have come under my notice for the last seventeen years, and who have been able to take proper care of themselves, and to avoid exposure to cold and over fatigue, have continued for years to enjoy nearly the same amount of health, if not more, as immediately after their recovery.

Some have since died of other and altogether different diseases.

Where health has not been maintained and there has been any return of lung disease, the relapse has always been owing to local,

non-specific, non-tubercular inflammation (on this point I am particular), of a catarrhal or bronchial nature, induced by the weather or other external causes. The practitioner who has had but little or no experience in the use of the Hypophosphites, and still less faith in their efficacy, is often ready to mistake these accidental inflammatory complications for a recurrence of the disease and a recrudescence of the tubercular deposit.

The signs of accidental or incidental softening of tubercular matter, which was previously in a crude state, or else increased peritubercular hyperæmia, which is one of the conditions of resolution and resorption, are also sometimes mistaken for those of fresh tubercular deposit.

Occasionally accidental inflammation of incipient cicatrices, or of tissue that was only consolidated, or transient inflammation of new tissue, may equally be mistaken for a new tubercular deposit.

More extended experience, a due regard to the rational symptoms, and, above all, attentive stethoscopic examination, will, however, usually lead to a more correct opinion.

When the recovery is still recent, the stethoscopic signs, which may be those of congestion, bronchitis, or even of pleurisy, or pneumonia of different extent and intensity, usually occupy the seat of the primitive local lesion, and may thus mislead the inaccurate and inexperienced, above all, the prejudiced, practitioner.

I have seen several cases where accidental inflammation in an excavated lung, which had been cicatrized by the use of the Hypophosphites, has been mistaken for the very last stage of phthisis by the most distinguished physicians.

One of the most delicate points for the physician's decision is the true moment when it becomes advisable to resume the specific treatment after the occurrence of accidental inflammation.

I therefore confidently repeat the assertion I made many years ago, that as long as the patient is kept in a proper physiological condition by the prophylactic use of the Hypophosphites, according to the rules which will be given further on, I have never witnessed a recurrence of a fresh attack of tuberculosis. Now all practitioners who have seen a large number of consumptive cases, know how frequently this happens, particularly in children, when the treatment is

confined to the ordinary means, such as cod liver oil, tonics, etc. Even in the instances where, owing to the general condition of the patient, without any local signs in the lungs, there has only been a suspicion of phthisis, how often does it happen that after an apparent return to health, of greater or less duration, the disease shows itself a second time, too frequently in an unmistakable manner. The means which appear to have answered in the first instance are now seen to fail, and the disease runs its course to the fatal end.

These are the instances where the Hypophosphites again and again show their wonderful efficacy. I could relate any number of cases, observed at my dispensary at Paris, among poor and ill-fed children, where, whenever the Hypophosphites have been omitted beyond a certain length of time, the disease has reappeared, and has each time been arrested with the same success as at first. Such cases are true *experimenta crucis*, and demonstrate beyond doubt the specific action of the remedy.

CONCLUSIONS.

I.—“One of the characteristic phenomena produced by Hypophosphites in the system is the production of venous plethora.

II.—This plethora is the condition of their therapeutic action against phthisis.

III.—This therapeutic action must be limited to the physiogenic effects, which afford the measure by which we should be guided in the use of them.

IV.—Beyond this limit their medicinal effects are either transient or incomplete, and are not followed by a curative result, even with the co-existence of all other necessary conditions.

V.—The use of the Hypophosphites in too large doses, or for too prolonged a period, produces symptoms which I have called pathogenic, and is then apt to lead to accidental complications of variable degrees of intensity, which may bring on a fatal termination, owing to this mistake in treatment, even though the patient otherwise offers all the conditions necessary for a cure.

VI.—As happens for other cachexiæ, the local lesion, which is the result and the anatomical sign of the tubercular diathesis, when

once it has overpassed a certain limit, pursues the usual course of its evolution by virtue of conditions which are to a great extent independent of the initial morbid constitutional state.

VII.—The cure of the diathesis is not, therefore, necessarily and immediately followed by that of the lesion, although that of the lesion cannot be permanent unless it be attended or preceded by that of the diathetic condition.

VIII.—The recovery of a patient subjected to the Hypophosphite treatment will therefore depend upon the extent of the pre-existing local lesion; that is, of the gravity of the disorganization, which has taken place previous to treatment.

IX.—When the tubercular deposit has not gone beyond a certain stage of its natural evolution, it may be reabsorbed and entirely disappear. This re-absorption may take place not only when the tubercular matter is still in a crude state, but even when it has already reached the stage of softening.

X.—This second stage, of softening, is sometimes one of the phenomena intermediate between the therapeutic action of the Hypophosphites and their therapeutic effect. Sometimes it simply precedes the re-absorption of the morbid deposit, at other times it will go on to produce ulceration, destruction of the surrounding tissues, and finally consolidation or a cicatrized excavation.

XI.—The cure of phthisis by the Hypophosphites may therefore take place in two different ways, either by the disappearance of the local lesions, and by a cessation of the physical signs which indicate their presence, or by the persistence during a variable period of time of less extensive pulmonary disturbance, which, however, does not interfere, or only partially interferes, with the general health, and which does not predispose the patient to a recurrence of the original diathetic condition.

XII.—If during the persistence of the local signs in the lungs, the patient be kept in hygienic conditions proportionately adapted to the gravity of the persisting organic lesions; if he be maintained under the influence of the specific treatment at proper prophylactic doses; * * * the stethoscopic and plessimetric sounds will be found gradually to improve until they lose their pathognomic character, or even entirely disappear.

XIII.—Time is an indispensable element in the cure of a case of phthisis, and no other means can be substituted in its place.

XIV.—An overdose of the specific remedy, instead of hastening the patient's recovery, will often produce a contrary effect. The greater the extent, and the more advanced the stage of the pulmonary disease, the more important it is to keep this fact in view, because a contrary conduct will then, still more than at other times, produce accidental complications.

XV.—As in almost all cases of phthisis the tubercular deposit takes place gradually and invades successive portions of the lungs, there is always a greater or less lapse of time during which the local lesion is of secondary importance; *and until that point has been over-passed, every uncomplicated case of tubercular consumption may be cured with perfect certainty by the scientific use of the Hypophosphites.*

XVI.—Every practitioner who is called upon to treat a case of phthisis is therefore bound, not only for the sake of humanity, but by the rules of medical science, to have recourse *at once* to the Hypophosphites, instead of only using them as a last shift after the loss of irreparable tissue, and it may be of irreparable time wasted in administering drugs, which are notoriously of no effect.

XVII.—If the Hypophosphites be the specific of phthisis, they must *a fortiori* be its prophylactic or preservative remedy.

XVIII.—As when rationally administered they never produce any unfavorable effect, they should immediately be had recourse to in every doubtful case, or even when there is only a suspicion of consumption.

XIX.—All these conclusions are now confirmed by the independent testimony of physicians living in all parts of the world.

XX.—In no instance have they been controverted, when the observer has carried out his experiment with care, and *according to the rules laid down.* Physicians who had been unsuccessful in their first attempts, have in later efforts and after greater experience in the use of the remedy completely confirmed my views.

XXI.—The effect of the Hypophosphites on the tubercular constitution, depends upon a general action of the system, which at a future day will come to be recognized as of still greater importance than their effects in disease. In our present imperfect social state,

there is a constant tendency to increased disturbance of the conditions of normal nutrition, which is effectually combated by the use of the Hypophosphites as an occasional and temporary nutriment. This result can be obtained by no other means hitherto known, than the use of some one of the oxidizable phosphorus compounds, the best of which are the Hypophosphites.

XXII.—By means of *these therapeutical agents the functions of innervation or nerve power, of sanguification or blood-forming process, and of interstitial nutrition*, which are the *three primordial functions* in the animal system, may be kept or gradually raised to the very *highest degree of intensity*, of which the organic conditions of the subject will admit."

EXTRACTS FROM CHURCHILL'S VIEWS AS TO THE THEORY OF TUBERCULOSIS.

"So far, all the facts of pathological physiology known with regard to tuberculosis concur in showing that the special character of the diathesis is a decrease of molecular or intra-organic combustion, from which may be inferred all the abnormal phenomena depending on diminished oxidation as evinced in the functions of respiration, sanguification, urinary excretion and calorification. This is in complete accordance with the theory of phosphology, viz., that in tuberculosis, the bioplasmic or proteic principles are incompletely oxidized, because they are deficient in their normal amount of the phosphide (*oxidizable* phosphorus) element, and are thus less combustible than in the healthy state."

"Tubercular matter is * * * bioplasmic albuminoid substance, imperfectly developed on account of it having undergone incomplete oxidation, not, as was supposed by Beddoes and McCormack, because there is a deficiency of oxygen, but because the materials themselves have lost their affinity for it, in consequence of a decrease in their phosphide (*oxidizable* phosphorus) element.

Color of the Blood.—It has long been a matter of observation by physicians, that the venous blood of consumptives is redder than in the natural condition.

Now we know that the black color of the venous blood depends upon the presence of carbonic acid, for, as Longet states, there can

be no doubt that the difference in color in the two kinds of blood in the veins, and in the arteries, is owing to the different proportions of oxygen and carbonic acid contained in the blood.

Experiments on the glands and muscles have shown that the blackness of venous blood is owing to its having been already employed in molecular metamorphosis; that the blackness is in proportion to the intensity of this molecular action, and that it increases or decreases with this intensity (Claude Bernard). We have just seen that redness is characteristic of venous blood of consumptives, and the use of the Hypophosphites darkens the color of the venous blood, not only up to, but beyond, its natural tint.

Urine.—The fact of diminished oxidation is also shown by the deposit in the urine of consumptive patients containing an excess of uric acid, with a corresponding decrease of urea (Becquerel; Ancell).

These urinary sediments usually diminish or disappear under the use of Hypophosphites. That this is due to an increase of oxidation will be apparent if we consider that the formula of uric acid is $C_5H_4N_2O_2HO$; while that of urea is $C_2H_4N_2O_2$; so that, as Lehmann has shown, urea may be looked upon as formed by the partial or incomplete oxidation of two atoms of uric acid with formation of oxalic acid and allantoine.

This has been shown to be really the fact by Wohler and Frerichs, who have by direct experiments upon dogs and rabbits, found that uric acid was decomposed in the system in the same way as when oxidized directly by peroxide of lead, and that after its administration the urine of those animals shows an increase of urea and of oxalate of lime.

Calorification.—The lowering of the heat of the body in tubercular patients has been noticed by a number of observers, and has been specially studied by Bouchardat.

Sidney Ringer found that where there is an elevation of the temperature in phthisis it was only while the deposit was taking place, and has shown that it then constitutes a valuable diagnostic sign. Finlayson found that in tubercular children the temperature was higher in the evening, after the excitement and fatigue of the day; but in the morning rather below the average.

This decrease of heat accounts for the great sensitiveness to cold and atmospheric variations.

If we class the combustible elements of the system according to their heat equivalent, that is to say, according to the quantity of water which they can raise one degree in temperature by combining with the same quantity of oxygen we shall find that they rank in the following order (Gavarret):

Phosphorus 36.072, hydrogen 33.808, iron 33.072, carbon 23,696, sulphur 17.660.

Heat is both a result and a constant condition of all molecular actions which take place in living beings, and above all in animals. So that phosphorus, among all the oxidizable elements of the system, will raise highest the temperature of the combining bodies.

From what precedes, we shall be justified in inferring that of all the proximate principles in the animal system, those which contain the phosphide element, that is to say, phosphorus in an oxidizable condition, must have the greatest affinity for oxygen, and the greatest calorific capacity, and that they must influence more powerfully than any other compounds the two primary physical and chemical conditions of animal life, particularly among the warm-blooded animals—*intra-organic* combustion and the production of heat.

Scrofula.—What is the real connection between scrofula and pulmonary tuberculosis?—a question which has much worried pathologists and physicians in all ages.

The phospholigic theory again affords a satisfactory solution.

Organic materials must pass through a succession of metamorphoses, characterized by a gradual series of successive oxidations in the lungs, in the capillaries and in the lymphatics.

If this be the case, these successive oxidations must apply in turn to materials of decreasing combustibility.

If the phospholigy be very intense, the materials offered to hæmatisis in the lungs will be so refractory to oxidation that some of them will not be able to undergo even the initiatory stage of the process, and these will be at once deposited in the lungs in the form of tubercular matter.

If the phospholigy be less strongly marked, there will be sufficient oxidizable principles to provide for pulmonary combustion, and

a first degree of oxidation. But their affinity for oxygen will then be exhausted, and as they will be unable to undergo the subsequent oxidations required in the capillaries and in the lymphatic system, these are the points where oxidation will remain incomplete, and where the secondary deposit of tubercular matter will take place.

Scrofula is thus an incomplete and less intense form of tuberculosis than pulmonary phthisis affecting different histological elements."

NOTE.—The following is a summary of Dr. Churchill's argument, itself too lengthy to reproduce here, regarding the theory of tuberculosis.

R. W. G.

SUMMARY OF ARGUMENT.

I.—The animal system contains, as an essential constituent of the brain and nervous substance, of the blood discs, of the muscles, of the albuminoid compounds, of the spermatozoa, of the egg, in a word, of the most important parts of the organism, a phosph-*ide* element which has not yet been completely analyzed or isolated as a chemical compound, which has been called by many different names, but which, since my researches upon the subject, is now clearly recognized as distinct from the phosph-*atic* element.

II.—The essential characteristic of this phosphide element is, that the phosphorus is contained in it in a state of molecular combination with the other chemical principles, and is not yet completely oxidized, while in the phosphatic element (such as the phosphate of lime in the bones) it *is* completely oxidized.

III.—This phosphide element is of all the materials of the system the one which has the greatest affinity for oxygen, and seems to be, in animals, one, if not the first, of the primordial initiators of vital activity. Its office is not only to become oxidized itself, but to promote the intra-organic combustion, and hence very likely to initiate the molecular metamorphosis of most of the other proximate animal principles.

IV.—The decrease in the system of this phosphide element, either from excessive waste, or from a deficiency in its reintegration constitutes a distinct and special morbid condition of the whole system which I call *phospholigy*.

V.—This pathological condition leads to a decrease of oxidation; consequently of all organic metamorphosis, and of all vital action, and is characterized by the whole series of symptoms which precede or accompany a numerous class of diseases, and which have vaguely been called 'deficient or lowered vitality.'

VI.—When this decrease of the phosphide element attains a certain degree of intensity, the oxidizability of certain compounds in the system is so much diminished, that they become incapable of sufficient combustion, either to proceed to a higher state of vitality, or to go through that process of disintegration which would lead to their excretion from the system.

VII.—Under such circumstances these compounds constitute an abnormal material, consisting of incompletely developed bioplasm or proteic substance, variable in its composition, forming the different pathological deposits known under the name of tubercles, which are the anatomical characteristics of phthisis and scrofula.

VIII.—The difference between phthisis and scrofula consists in a different degree of phosphology. In scrofula, the phosphology is less than in phthisis, so that the exhaustion of the phosphide element in the bioplasm only takes place during a secondary or subsequent phasis of its evolution.

IX.—This theory of phosphology enables us to account for nearly all the phenomena hitherto met with in tubercular disease.

Such are the morbid physiological phenomena in the respiratory, circulatory, urinary and calorific functions:

The elective preference shown by the tubercular deposit for different systems or organs.

The affinity between tuberculosis, scrofula, spanhæmia and chlorosis.

The antagonism between tuberculosis and cancer, and between tuberculosis and cyanosis.

The prevalence of tuberculosis in certain classes of animals, and its rarity in others.

The mode of action of the different etiological causes, which promote or produce, and of the different cosmic or organic conditions, which aggravate or interfere with, and retard tuberculosis and tuberculation.

X.—Not only does this theory of phosphology thus account for a large mass of scientific facts, which have hitherto remained, many of them, comparatively unknown, and all of them unconnected and unexplained, but it points to a new and higher view of pathology, in which, most probably, the many ills which flesh is heir to, will be referable to a small and definite number of initiatory morbid states, themselves depending upon a modification either in the quantity or the quality of some few of the most essential or primordial proximate principles of the animal system."

DR. CHURCHILL ON HYPOPHOSPHITES IN OTHER DISEASES THAN PHTHISIS.

"I have found the Hypophosphites particularly useful in the following complaints, for most of which, my own experience has been confirmed by that of other observers.

All adynamic conditions of the nervous system. Chronic myelitis.

In these cases the Hypophosphites of Iron, Manganese, Lime, Potash, Quinia, and Baryta, will be found the most useful.

In diseases of hæmatisis, such as *chlorosis* and *anæmia* in all its forms.

In these cases the preference should be given to the Hypophosphate of Iron, Manganese, Quinia and Lime.

The most inveterate cases of anæmia will be found to yield to this treatment, and the Hypophosphate of Iron has this particular advantage over all other preparations of this metal, that in cases where tubercular anæmia exists and, as often occurs, has been mistaken for simple anæmia, it not only cures the blood disease, but wards off the effects of the constitutional predisposition, which as is well known, all other preparations of iron, have, on the contrary, a tendency to accelerate and aggravate.

In all diseases depending on *imperfect, incomplete, or retarded development*, the Hypophosphites not only bear off the palm from all other remedies, but will be found to succeed when no other has been of any avail.

Such for instance are *difficult and retarded dentition* in infants, *rickets*, *anæmia*, and weakness during *pregnancy*.

The Hypophosphite of Lime for infants, to which may be added, more especially for adults, those of Iron and Quinine, will be found in these instances best to fulfill the therapeutic indications.

In the difficult dentition of infants, I have seen cases where the little patient, reduced by suffering to the very last degree of emaciation, and either threatened or already attacked with convulsions, has been relieved in the course of a few days, sometimes with the very first dose, and very soon permanently cured by a few teaspoonfuls of Syrup of Hypophosphite of Lime. The whole apparatus of symptoms has literally been *swept away at once*.

In *chronic bronchitis* and in the *sequelæ of inflammatory diseases of the respiratory organs*, where there is debility depending upon anæmia and lowered nutrition, great benefit will frequently be derived from the use of the Hypophosphites, particularly the Hypophosphite of Potash.

A mixture of the Syrups of Hypophosphites of Potash and Soda, will frequently be found more useful than either separately. In some cases of *asthma*, where nutrition has become greatly impaired, the same benefit will be derived from the use of these medicines.

Dr. Gantillon, of Paris, in his work on "*Uterine Catarrh*," [1868] states that in this complaint, he habitually prescribes the Hypophosphite of Iron, and after continuing it for a fortnight, changes it for the Hypophosphite of Manganese. "This alternation of medicines," says he, "is very beneficial, patients appear to be relieved by the change, and the use of the remedies may be continued for a longer time than with other preparations." Churchill, 1888.

From the *British Medical Journal*, October 17th, 1891, pp. 836-37. Extract from an address on "The use of Drugs in the Treatment of Early Phthisis," by J. C. Thorowgood, M. D., F. R. C. P. Senior Physician to the City of London Hospital for Diseases of the Chest, Victoria Park. Read in the section of Medicine at the Annual Meeting of the British Medical Association held in Bournemouth, July, 1891.

"It is in cases of catarrh at the lung apex, due to cold caught, or to respiration for some time of close vitiated air, that drug treatment appears to advantage. That peculiar catarrhal state of the apex, which has been described as pulmonary cachexia, and which is close on the borders of tubercle, and is due to a degenerated condition of the

epithelium from constant respiration of bad air, improves rapidly when the patient is removed to pure air, such as that of Bournemouth.

Where, however, we cannot give the patient the advantage of removal we have to do our best with drugs. Specially I would draw attention to the good results that may be obtained in such cases from the use of the Hypophosphites. The result of some twenty-five years experience in the use of the Hypophosphite Salts, has led me to the following conclusions based on records of cases:

Hospital out-patients who came with cough and expectoration, perhaps blood-stained at times, and who presented rales at the lung apex, continuing there after some amount of bronchitis due to cold had been overcome by various remedies, improved in a way that surprised me on giving them five grains of Hypophosphite of Soda three times a day. The patients got better, and some would return in perhaps six months' time with the same symptoms and signs again, and would again improve on the Hypophosphite treatment. In cases of persistent consolidation of lung after pneumonia, I have in very many cases seen absorption of effused products proceed speedily under treatment with Hypophosphite of Soda; this too, in cases where ordinary treatment had been followed to no purpose for some time. Cases of this description that appeared doomed to a speedy death by phthisis, I have seen clear up and recover perfectly on five grains of Hypophosphite of Sodium given three times daily for five or six weeks. In cases of pleurisy with effusion, the Hypophosphite Salts seemed to me to have no effect whatever.

In cases where the pleura appeared to have been roughened by deposit, so that friction sounds of loud and coarse character were very audible; I have seen all these sounds vanish and the patient do well under the Hypophosphite of Soda.

Before the days of tubercle bacillus I had learnt that there were cases of phthisis attended with fever, and rapid in progress in which the Hypophosphite failed in a way that I could not understand. I believe from more recent observation, that these were cases where the tubercle bacillus was too strong to be overcome by a medicine whose action lay mainly in promoting the absorption of inflammatory products.

Many years ago Dr. Graves, of Dublin, as well as Dr. Rush, of Philadelphia, and Dr. Munk, of London, laid stress on the use of

mercury as an absorbent in cases of phthisis. Mercury, says Graves, is of use where the affection of the lung is local and the system not affected.

In scrofulous pneumonia, rather than in tuberculous disease, the mercury is said to act with most advantage. How far this is true, I will not now stay to inquire; but the idea in giving mercury was to get rid of inflammatory deposit, and so prevent phthisis. We now say "get rid of inflammatory deposits, and so take away what may prove a nest for the growth of tubercle bacilli."

Whether it be phosphorus or a Hypophosphite that is given, I believe a process of fatty change and liquifaction of the effused product is set up and absorption follows. Sometimes the process seems to me for a time attended with some amount of increase of temperature, and when this is the case, it is well to reduce the dose of the drug, or give it at longer intervals. In recurring hæmoptysis, too, the Hypophosphite must be used with care. The most active in liquifacient power is Hypophosphite of Potash; and I remember a practitioner telling me he had given, as he said, the Hypophosphite of Soda, and it caused such a rapid breaking down of the lung, that he determined to have nothing more to do with Hypophosphites in phthisis. It turned out to be the Hypophosphite of Potash that he had been giving. The Lime Hypophosphite acts often remarkably well in cases where secretion is profuse.

The daughter of a medical man was cured of bad diarrhœa by Hypophosphite of Lime. The lime salt checks profuse sweating and also diarrhœa. The dose should not exceed five grains.

Very rarely indeed have I found when the Hypophosphite fails to remove an apex catarrh, or inflammatory deposit, that I have gained by changing to such medicines as tartarated antimony in very small dose, iodide of potassium, or some form of mercury. Once or twice a change of treatment has been eminently unsatisfactory; in one case clearly disastrous."

CLINICAL EXPERIENCES WITH THE HYPOPHOSPHITES.

PHTHISIS PULMONALIS AND ITS TREATMENT WITH HYPOPHOSPHITES.

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The Tubercular Diathesis Probably Depends on a Disturbance in the Hæmotosic Function.—Examination in Detail of the Organic and Inorganic Elements.—We believe that the tubercular diathesis can only depend on the disturbance of some one of the primordial functions of the economy.

In view of the solidarity that exists between all the parts of the organism, this disturbance should have for its initial point one essential condition, a modification of the hæmatosis.

The labors of pathologists, and especially of Andral and Gavaret, since confirmed by other observers, show that in phthisis, while the composition of the blood varies, there is no particular or distinctive character in the change that occurs in its organic elements; we are then led to believe that it must be among the inorganic elements that we are to find the special condition of the diathesis. But which one? There is the difficulty.

As the phenomena of this disease, considered in relation to those of some other dyscrasia, and especially to chlorosis, seem to show that they should be referred rather to the loss than the increase of some essential element, the question arises, which one is wanting?

Science possesses numerous facts proving the effect of most of these influences on the economy. Thus iron, sulphur, the chlorides, the alkalis, are of daily use. All, or nearly all, of them have been tried in the treatment of tuberculosis, and no one of them has shown a sufficiently marked or lasting effect to be able to attribute to it any real influence in this disease.

Now another element arrests our attention, viz., the phosphorus.

We know, in fact, that this element is one of the constant principles of the economy.

But our science is limited to that. Chemistry has not yet been able to demonstrate in what condition it exists in the blood; whether it is there as phosphoric acid or as phosphorus combined molecularly with organic matter, though Rees, in his work published in 1848, assigns it a part in the function of the globules.

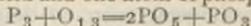
The phosphates, and especially the phosphate of lime, have long been employed in rachitis.

Now to examine the facts.

Should this medicine have the immediate action on the disease which would belong to the element which is its starting point?

Now comes the element phosphorus, and if one reflects on the physiological effects of this substance as it is reported by Bayle in his Therapeutic Dictionary, it would seem that the stimulating properties which are attributed to it, that its action on the different morbid states of the system would make it a useful antagonist to phthisis.

If we admit that the phosphorized principle of the blood or organism is found there in any other state than that of phosphoric acid, it follows that it must play the part of an eminently combustible body, and capable at the same time of entering into molecular combination with the other elements of the organism in such a way as to become an integral part of it. But neither phosphoric acid nor phosphorus fulfills this condition. The first is already at its maximum of oxidation; the second, placed in contact with the liquids of the stomach or with the tissues, must, before being absorbed and rendered assimilable by the economy, be transformed either into phosphoric acid, or at least into hypophosphorous or phosphorous acid, the degree of oxidation immediately below that of phosphoric acid. In the first case the same effects are obtained as in employing phosphoric acid itself; in the second, supposing that the phosphorus, before being absorbed, should be transformed only into hypophosphorous acid, this latter must, in contact with the alkaline principles of the blood, be transformed or rather divided into two atoms of phosphoric acid and one atom of phosphorous acid:



This last would fulfill the two conditions enunciated above, but with the disadvantage of only representing under the most favorable conditions but a third of the phosphorus taken into the stomach, the two-thirds transformed into phosphoric acid being lost for special action.

Besides, from this point of view the action on the economy of the various preparations of phosphorus depends on the quantity of substance which is formed in an oxidizable state at the moment of absorption.

Its efficacy would vary with a crowd of circumstances impossible to foresee, such as the vehicle the remedy might be dissolved in, the age of the preparation, the nature of the substance with which it might come in contact in the digestive tube, the activity of absorption in the tube, etc., etc.

These conditions explain why preparations of phosphorus are so unreliable, and why on the one hand Coindet could obtain certain results in employing them in large doses, while on the other hand Bartz and Rillet, with weaker doses, could only arrive at negative results. If, then, we think that we thus have found the reason for these contradictions, we can logically establish the double hypothesis enunciated by Dr. J. F. Churchill, viz: "The tubercular diathesis depends on a diminution in the economy of the phosphorized element, and this element having to fulfill in it the function of a combustible body, it must be found there in a degree of oxidation inferior to PO_5 ."

The hypophosphorous acid, combined with a base, seems to me to be the most appropriate form, though, however, Orfila and Bevergei say that the toxic effect of phosphorus is due to its transformation into hypophosphorous and phosphorous acid.

An experience of many years has demonstrated to me that in spite of these opinions, the hypophosphorous acid is perfectly well borne without any toxic effect when combined with a base, as soda, lime, quinine, manganese, potassa, etc., etc.

So, then, if we confine ourselves strictly to the above expressed theory, we must conclude that the salts to employ are the *Hypophosphites*.

On the Mode of Action of the Hypophosphites.—On the Condition of their Curative Action.—Before indicating the mode of action of the remedies, we should briefly recall the different phases of the disease.

Phthisis and tubercular affections are due to the presence in the different organs of certain morbid products to which we give the name of tubercles, and whose anatomical character, visible to the naked eye, are now perfectly well known.

Neither microscopical research nor chemical analysis has succeeded in finding a constant and pathognomonic element or composition in the tubercle.

Tubercles, once deposited, nearly always follow a regular evolution, in which we recognize generally three periods:

First.—Crudity.

Second.—Softening.

Third.—Ulceration or excavation.

In the period of crudity tubercles appear to influence the surrounding tissues only as foreign bodies, acting physically by their number, mass, and volume.

In the period of softening their effect is to modify the organic conditions of the surrounding tissues, producing in them a state of hyperemia and even of local phlogosis, the result most frequently being the general phenomena which characterize the inflammatory state, and in addition, various troubles, either general or local, according to the location, nature, and function of the affected part.

The third period, which is the immediate consequence of the preceding one, results in the more or less extensive ulceration and destruction of the organ invaded by tubercular deposit.

Such is the inevitable progress of tubercles.

But in some cases the organism seems to desire to rid itself of the morbid product by a sort of intra-organic elimination, isolating it from the neighboring tissues by what has been called encystment or cretation; finally—sometimes, though very rarely—when tubercles have followed their rational evolution, the tissues in which they have produced ulceration and partial destruction, cicatrize or cover themselves with an accidental membrane of new formation (fibro-cellular membrane, fibroid nodular tissue.)

Now to the mode of action of the Hypophosphites.

It is twofold.

On the one hand they increase the principle, whatever it may be, which constitutes nervous power. On the other hand, they are blood-makers of the best kind, more rapid and powerful than any heretofore known.

The intimate connection observed between these two functions leads to the conclusion that the primitive action of these salts consists in stimulating some primordial condition of the general nutrition, a stimulation which they produce either by modifying the elements of hæmatosis, or by acting directly upon the nervous system of organic life.

Physiogenic Effects.—The physiogenic effects are an increase in the power of general innervation, fullness and color of the face, increased weight, etc., etc.

Pathogenic Effects.—The pathogenic effects are produced by a too long continued use or excessive doses of the medicine.

Patients whose cheeks had become full complain that they are getting thin, they complain of dull pains all over the body and especially in the limbs, of headache, vertigo, enfeebled vision, and sometimes of fever. The appetite, which previously had improved, is considerably diminished; and sometimes there is diarrhœa; clearly then there is exaggerated hæmatosis.

Auscultation sometimes reveals also, in this condition, signs of pulmonary engorgement; there is epistaxis, and often hæmoptysis.

So the fullness of the face will indicate the physiogenic effects, and epistaxis the commencing phase of the pathogenic phenomena.

Therapeutic Effects.—The therapeutic effects of a substance, being the result, as we believe, of its physiogenic and pathogenic effects, are of a more complex order, but in their turn are less complex than the curative result.

Each phenomenon of these divers orders requires for its manifestations some conditions more and more numerous, that is to say, more and more complex, and cure is the final expression.

So then, a phosphoric medication administered in a given measure, and for a sufficiently long time, will put an end to the tubercular diathesis. But this cessation without which a cure is impossible, is not the cure itself; it is only the primordial and specific condition.

Whilst the action of the medicine is identical in all cases, in that which regards the general affection there will be as a secondary effect a different result with each patient, according to the pre-existing lesion before its use.

As to the influence which the cessation of the diathesis will have on the local lesions; this, in the actual state of science, could not be established *a priori*. To know it we must have recourse to observation and assign it its true function, that of confirming or disproving conditions deduced from theory, and above all of establishing their limits; that is to say the conditions under which these deductions are verified. This will teach us that the treatment of a diathesis by its specific, influences organic lesions already established merely in an indirect way, their ulterior evolution being submitted to different conditions from those which give rise to them.

Thus, for example, mercury cures the syphilitic diathesis, but does it at once cause a necrosis, or a caries, produced by the venereal virus, to disappear?

Does it cause the pus formed by the suppuration of a lymphatic ganglion to be absorbed?

Certainly not; the diathesis once eliminated, it merely restores the abscess which pre-existed the treatment to the condition of any other phlegmon, and subjects it to the same rules of treatment.

Quinine, which prevents attacks of intermittent fever with a power that those who have not seen pernicious fevers in tropical climates can form no idea of—quinine, so heroic against the physiological troubles, is powerless against nearly all of the visceral lesions which result from it; and yet these very lesions, once established, cannot be, for the most part, successfully treated until the specific has put an end to the essential morbid state which produces them and which keeps them up.

Finally, vaccine for a longer or shorter time destroys in the economy an unknown condition, but essential to the development of small pox. It is powerless against the disease once established, that is to say, it prevents but does not cure it.

It is the same with the hypophosphites in phthisis; by the action of the phosphorus preparation on tuberculosis, the economy is brought back to its normal condition, from which all the organic disorders have sprung. But what influence can this return of the general equilibrium have on the local manifestations? What are the secondary circumstances necessary to effect a curative result? What are those which can hinder or retard the result?

This is what observation alone can teach us.

Supposing that one agrees with the author that phosphorus preparations are a specific against phthisis, it follows in no wise, as some practitioners seem to think, that the curative result should then be a very simple phenomenon, so simple that the first comer would bring it about with assurance and ease provided that he administered the Hypophosphite.

It would be so in fact, if the medication should be employed from the very outset of the disease, when the pulmonary disorders are insignificant and circumscribed; and this it is which logic, science, and humanity together demand.

Logic: because it is absurd to allow so fatal a disease as phthisis to progress, when there is a certain means of stopping it.

Science: because it is acknowledged that we have no other medicine capable of surely resisting this diathesis.

Humanity: because, even though he should not believe in the efficacy of the treatment, a physician should regard it as his duty to try it, in the acknowledged impotence of other medications.

We shall now endeavor to explain the conditions of the curative action of the Hypophosphites.

These conditions, as in all treatments, are of three kinds.

First.—Those that relate to the patient, which are the pathological conditions.

Second.—Those that belong to the medicine, as its chemical composition, its medicinal form, etc., etc.; these are the pharmacologic conditions.

Third.—Those that result from the action of the medicine on the patient; these are the therapeutic conditions.

The pathological state is determined by examination, the result of which is the diagnosis.

The pharmacologic condition will be made the subject of another chapter.

Of the therapeutic conditions we shall try to make as brief an explanation as befits this essay.

The rules ordinarily given to be followed in the administration of a medicine are often only a tissue of uncertainty and confusion. Not only is there no general principle which governs therapeutics as a whole, but if each medicine be taken in detail, nothing is more variable than the opinion of observers on the dose and mode of administration.

This arises from the fact, that the action of a drug is an eminently dynamic phenomenon, which itself depends on two elements, both variable, but one (the drug) varying with the will of the experimenter, the other (the organism) more often withdrawn from his influence. It is evident that a phenomenon, which is then a result of a relation established between two variable elements, one of which only is under one's control, cannot be produced in a constant form, until we find the law which governs the series of results produced by the different relations which we have created between the generating elements.

It is true that therapeutists make a distinction between the physiological action of a drug, and its therapeutic one; but this very distinction has been deduced not from its real relation between the medicine on the one hand, and the organism on the other; but from the normal or abnormal condition of the organism itself.

In reality it can only be, as we have just said, the result of two elements, one of which only is capable of being determined exactly in advance. Hence follows the method adopted always in therapeutics of seeing only between the phenomenon of disease and the idea of cure, but a single middle term. The administration of a drug in fixed doses, can only give results essentially varying and contradictory.

Thus, for example, it is laid down that doses must be fixed according to the age, sex, and morbid condition of the patient. It is also true in certain medicines, which distinguish what has been called the medicinal action of accidents which they may produce.

But in all this we find nothing exact, no general fact which may explain the medicinal action of every substance, no matter which. In one word, we have not yet understood the necessity of establishing an exact measure of medicinal action.

Can such a measure exist? and, if it exists, when shall we find it? We believe that it is to be found in the gradation of the very effects produced by the medicine.

Putting to one side the division heretofore admitted, let us look at the physiogenic and pathogenic effects of a medicine on the system which is in a state of health or disease.

The first consist in the increase or diminution of normal functions without passing their physiological limits, and consequently without the production of any morbid phenomena.

The second comprise all phenomena produced by the treatment other than those which exist in the normal condition. So long as there is only increase or diminution of function, its action is limited to the sphere of physiogenic phenomena. As soon as abnormal phenomena are manifested, it enters into that of pathogenic action.

Thus mercury, in proper alterative doses, produces only physiogenic phenomena. When the dose is increased, salivation occurs among other effects, indicating to the most careless observer that the pathogenic action has been attained.

Hydrocyanic acid, employed in the physiogenic dose, acts as a sedative; given in a larger quantity it produces, as pathogenic phenomena, nausea, respiratory trouble, headache, vertigo, and blindness.

These two sets of phenomena correspond; one, the physiogenic action, with the stimulus and the contra stimulus of the Rasorian school; the other, the pathogenic effects, with the action of the "Similia" of Hahnemann.

Thus, as the Rasorian teaches, every modification of the economy must consist either in an increase or diminution of the normal functions.

But the distinction thus established is inexact, and can only be a criterion, inasmuch as the change does not go beyond normal variations.

Besides, the pathogenic effects produced by medicines are true diseases, as the school of Hahnemann professes, and as was understood before it; but it in no wise follows, as this school pretends, that a medicine has no curative action unless its pathogenic effects resemble the disease against which it is employed—an error as grave as the entirely opposite one of the masses, who measure the efficacy of a medicine by the number and intensity of its pathogenic effects.

Pharmacological Conditions.—Above all things it is necessary that the medicine should be perfectly pure; so, I beg my brethren, before prescribing any salt of the hypophosphite, no matter what, to assure themselves of its purity.

I give Churchill's method of ascertaining the purity of the different salts:

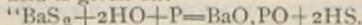
"Hypophosphite of Lime.—“The presence of carbonate of lime is recognized when the hypophosphite, heated with distilled water, throws down a white deposit, soluble with effervescence in dilute nitric acid, forming thus a solution precipitated by oxalate of ammonia.

"Hypophosphite of Soda.—“Carbonate of soda, being insoluble in alcohol, its presence is determined by washing the hypophosphite with concentrated alcohol; there remains a white deposit, soluble with effervescence in acids, whose solution is not precipitated by oxalate of ammonium.

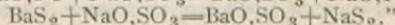
“To recognize the presence of free soda, we can make use of a salt of lead; for this purpose the hypophosphite is heated with concentrated alcohol. If the salt does not dissolve completely it is evaporated to dryness and the residuum taken off with distilled water. If the hypophosphite is pure, the aqueous solution thus obtained gives no precipitate by the addition of nitrate of lead to the sufficiently diluted liquid. If on the contrary, there is free soda present, we have a white precipitate of *hydrate of plombique*.

“Sulphide of sodium is recognized by the salts of lead, throwing down a black precipitate with an aqueous solution of the hypophosphite.

“The sulphate of sodium is met with in the hypophosphite prepared by double decomposition with sulphide of soda and hypophosphite of baryta. The latter salt is generally obtained by boiling a solution of bisulphide of barium with phosphorus, so long as any sulphohydric acid is given off:



“But it is difficult to transform all the bisulphide into hypophosphite, so that by the addition of sulphate of soda we form a bisulphide of sodium, which is combined with the hypophosphite:



We mention here only the two salts with which we are exclusively concerned in the treatment of phthisis.

Of the Different Causes and the Different Accidents which may Produce Phthisis.—In the first rank is inheritance.

It is by transmitting to their children special modifications of the economy, that parents give them the tubercular predisposition. This cause is so thoroughly recognized by all, that it needs only to be stated here.

Secondly—Accidental causes.

Some interesting researches made by Guy have demonstrated the influence of a deficiency of oxygen on the production of tubercles. He remarks that its development is intimately connected with want of space, and consequently with want of respirable air.

In the printing offices which he visited he noted the following facts:

In offices where the ratio of respirable air was under 500 cubic feet (English), the number of hæmoptois was 12.5, and of catrrhals to 12.5 in a hundred.

When the volume of respirable air was from 500 to 600 cubic feet, the number of hæmoptois fell to 4.35, that of catarrhals to 3.48 per cent.

Finally, when the amount of respirable air exceeded 600 cubic feet, the number of the first was but 3.96, and of the latter 1.98 per cent.

This crowding of individuals seems, then, to be an accidental cause sufficient to determine tuberculization in those already tainted with the tubercular diathesis; that is to say, those who in our point of view are deficient in the phosphorous element.

The great factories which contain hundreds of young girls, many of them of a lymphatic or scrofulous temperament, are the principal cause of the development of this terrible malady, which yearly carries off, in our good manufacturing cities, thousands of young girls, who, were it possible for them to be located where their lungs might find the necessary quantum of air, would not thus be a living holocaust, sacrificed to the *God of money*.

How many young girls, or young women too, who, to sacrifice to that other deity, *Fashion*, go to balls or parties scarcely clothed, and who, in going into the air, take at most no other precaution than that of carelessly knotting about the neck a lace handkerchief, which to them seems to be a sufficient guarantee against taking cold.

"Taking cold," with a subject affected with the diathesis, is evidently a cause of tuberculization, not only because it tends to diminish the intra-organic oxidation, already interfered with by the diathetic condition, but also because, to maintain the heat of the organism, the activity of the pulmonary function is increased, and a greater employment of the constituent elements of the nervous matter is required.

But we must always bear in mind that by the word cold, we mean the cooling really experienced by the organism, and not the simple atmospheric lowering of temperature.

Damp cold will act more energetically than dry cold, because damp being a better conductor of caloric than dry air, it will tend more powerfully to lower the temperature of the organism.

If, as Fossion says, the influence of cold has a direct action on the pulmonary tissue, it must act with more force on subjects having a tubercular predisposition.

Insufficient calorification is a constant phenomenon of the tubercular diathesis, but of itself it has a tendency to insufficient molecular reaction in the economy, which insufficiency in its turn depends on the absence of the phosphorous element, which is one of its principal originators.

Want of calorification in the tuberculous subject is then a secondary condition, an effect and not a cause.

Respiration.

The object of respiration being to bring organic matters into contact with the oxygen of the air, it is evident that in persons suffering from tubercular diathesis these matters will be incompletely oxidized, the result of their diminished affinity for this gas, and the incompletely oxidized products will be more abundant in proportion to the increased frequency of the respiratory act; because as the contact between the air and the successive and different materials to be oxidized is repeated, so much the more rapidly will the exchange between the pulmonary gases be effected, consequently the duration of the contact between the oxygen and the combustible matters contained in the lung will be diminished by reason of the frequency of the respiratory movements.

Everything, then, which hastens pulmonary action favors tuberculization.

Among women, according to Andral and Gavaret, menstruation is a sort of diverticulum to respiration; we can understand thus how amenorrhœa in diathetic subjects must be a cause of tuberculization, inasmuch as it increases pulmonary action.

Composition of Blood:

The composition of blood depends especially on that of globules, whose functions according to all physiologists are most important, but of which we have not to a certainty determined, either their true chemical composition, the part of the system in which they originate, nor even the difference they present in the various regions of the circulatory system as regards their quality and composition. Nevertheless from all the

researches on this subject, whatever may be their difference on other points, there results this important fact, that their production in the system depends on two general conditions: the absorption of alimentary substances and the reaction of these matters with the oxygen introduced by respiration; in other words, the oxidation of assimilated substances; this oxidation evidently depending on the affinity between the oxidizable matter and the combustible principle.

Consequently every change of composition which diminishes this affinity will diminish by so much the activity of the organic reaction necessary to produce blood corpuscles.

Their diminution would then be an immediate and necessary consequence of the tubercular diathesis. Because on the one hand phosphorus is the most combustible principle of the economy, and on the other, according to the analyses of Rees, Reich, Goble, and Percy, venous blood contains a phosphorous element, and especially according to the latter who—

“Finds it in the blood as a highly organized oleo-hypophosphite, having as one of its bases an active nitrogenous element, which element is oxidized by the contact of pulmonary oxygen, and appears in arterial blood as a phosphatic element.”

If the diminution of the number of globules is a constant condition of tuberculosis, if their existence is necessary for the accomplishment of hæmatisis, how does it happen that their diminution in chlorosis, for example, does not produce by the insufficient hæmatisis and this incomplete oxidation, tubercular matter, which according to the diathetic theory, should be its result?

According to the lights which we possess to resolve questions of this nature, the objection will disappear when we reflect on the different functions of the two elements, iron and phosphorus.

As we all know, according to the theory of Liebig, the function of iron is to absorb the oxygen in the lung, and to serve as a vehicle to carry it to the different parts of the system.

Phosphorus always following Rees and Reich, is oxidized in the lung immediately, at least in part, to pass from the condition of a *phosphitic* to that of a *phosphatic* element.

Besides, in chlorosis, though the globules are diminished in quantity, yet each one possesses substances having their normal affinity for oxygen, so that the organic metamorphoses which take place during the act of hæmatisis are fewer but not the less complete, so that the final result will be a variation in the quantity but not in the quality of the products resulting from the act of pulmonary respiration.

The theory of the tubercular diathesis explains, then, the decrease of the corpuscles of the blood in phthisis, and the relation which exists between tuberculosis and chlorotic anæmia.

Of the Different Medicines that have been Employed in Phthisis and of their Results.—These are innumerable, but no one of them has as yet brought about a certain cure.

It is generally admitted that 4 per cent, of tubercular cases are cured with or without medication.

We do not believe that any greater success has been obtained with any medicine heretofore employed (except with the phosphorous medication).

Most in vogue of all, and especially in England and in America, is cod liver oil.

First.—What action has this oil in phthisis?

Second.—Does it retard its progress?

Third.—Does it bring about a cure?

To these three observations we answer:

To the first: That in our opinion it has no direct action; it is only as a food that it can be useful.

To the second and third observations we answer categorically: *No!*

And here is one of the best proofs:

C. J. B. Williams, one of the first to employ and recommend cod liver oil in phthisis, the eminent practitioner, has established numerically and in a clear and definite manner, that in an experience of *twenty years* in the treatment of phthisis, "of *seven thousand* patients treated by cod liver oil, the number of cures did not reach *seventy*."*

That is to say, in that considerable number of patients, treated by one of the most able English physicians of our time, the number of cures did not attain *one per cent.*

This sad acknowledgement of the impotence of the remedy, stated officially, before the first medical society of England, has not met a single opponent, either in the medical press or elsewhere; and yet we see every day, thanks to the good old routine doctors who know, men whom the author recognizes as his masters, to whose decisions in many cases the medical world bows—we see, I say, these masters, in spite of the implicit avowal made by one of themselves, continue day after day, and in spite of all, to employ a medication which they know to be useless.

When we see a professor of the skill of F. Hughes Bennett explaining the action of cod liver oil (because he admits, with certain micrographers, that the primordial cell is composed of fatty and albuminoid nuclei, and comparing this idea with the fact observed by Ascheron, that if oil be shaken up with an albuminous solution, globules are formed, having the same composition, resting besides on the symptoms of emaciation in phthisical patients), conclude from it:

That fatty elements are wanting to constitute the nuclei of new corpuscles.

What shall we answer?

Do we not all know, as daily experience teaches us, that emaciation is not a condition but a consequence of the disease?

Finally, the most recent micrographic results on this subject show that the nucleus or the blastema, around which the cells form, is not composed of fat.†

Iodine:

For some time the action of cod liver oil was attempted to be explained by that of the iodine contained in it. But the action of iodine itself is completely negative against the tubercular diathesis.

Prof. Piorry himself, who had vaunted its efficacy recognized afterwards its uselessness. (*Pathologie Iatrique*, t. iv. p. 52.)

Conclusions.—The result of the ideas expressed in this work can be summed up in the following propositions:

First.—There exists in the system, as a constituent element of nervous matter, blood, the muscular organs, and, in general, of the albuminoid compounds, a phosphorous element not yet definitely isolated, and which is distinct from the now admitted *phosphatic element*.

Second.—As such, it constitutes one of the substances of the economy which has the greater affinity for oxygen, and as such, its probable function is not only to be oxidized itself, but also to promote combustion, and consequently, perhaps, to initiate organic metamorphoses in other substances.

Third.—The diminution of this phosphorous element in the system, whether as the result of its exhaustion or of a failure of reproduction, is one of the essential conditions of the tuberculous diathesis. In relation to the disease it plays a part of a direct or immediate cause.

Fourth.—The immediate effect of the existence of this condition is to diminish the degree of oxidation, to which certain matters in process of transformation reach; consequently, to render them unfit either to continue to fulfill their functions in the system, or to be eliminated from it in an excremental form.

Fifth.—The deposit of this abnormal matter under the form of proteic substances, incompletely developed and of variable composition, constitutes the different pathological

*Williams' Lumleian lecture before the London College of Physicians and Surgeons. (*The Lancet*, April, 1862).

†Micrographic Dictionary by Griffiths & Lanfrey. London, 1870, p. 125.

products known under the name of tubercle, and which are the anatomical characteristics of phthisis.

We will close in a few words.

We firmly believe that pulmonary phthisis is curable by an oxidizable and easily assimilated preparation of phosphorus, in all cases "*When the pre-existing lesion is not sufficiently serious to cause death*" (Churchill).

We give the preference to the Hypophosphites, as they seem to us to unite the best conditions.

As we generally cannot rely on any salts that are at our disposal in drug stores, the aim is to find a reliable preparation; and I will take the liberty of giving to the profession the result of my experience, after many trials of different preparations.

I have found only two that fulfill the necessary condition for good therapeutic effect, viz, *purity of the salts employed.*

Those to which I have given the preference, and the *only ones* that I exclusively employ, are the syrups of hypophosphite of soda and hypophosphite of lime, prepared by R. W. Gardner, chemist, New York City, and for the following reasons:

First.—The salt used is perfectly pure, and I keeps entirely unoxidized in the syrup.

Second.—He alone has understood that the different salts have to be employed separately, according to the stage of the disease, hence his two different syrups—soda and lime.

Third.—Because after many tests, at different periods, I have found them always the same, and the therapeutic effects obtained invariably good.

In giving my preference to one preparation, when perfectly convinced of its constant purity, I have only followed Dr. Churchill's example, who has never employed any other preparation than that made by Swan, Rue Castiglione, Paris, after he had become convinced, by repeated trials, of its purity.

My reasons for not using other and combined preparations are twofold.

The first, and not the least, is because the *mixture of the two salts* is entirely objectionable, and ought not to be used in that form by any physician understanding the therapeutic effects of the medicine.

Dr. J. F. Churchill, the initiator of the treatment with hypophosphites, the greatest authority in this case, has sometimes *alternated* the two different salts with the same patient, according to the physiogenic or pathogenic symptoms produced by either, but *he never mixed them*, knowing too well that in many cases one or the other was contra-indicated.

The second reason is that the hypophosphite salts, as sold, are always impure, and require careful chemical treatment to deprive them of dangerous impurities, which so interfere with their therapeutic action as to always modify, and frequently abort the result for which they are given.

Another suggestion that I would offer to my professional brethren is that the doses that are recommended for general use are too large, and sometimes enormous, surpassing three times the doses that Churchill has given as a general limit to obtain good therapeutic effects.

My own experience of more than twenty years in the treatment of the disease corresponds entirely with his directions.

It is true that at the beginning large doses will work marvels, but it will soon be shown that they aggravate in place of curing, and in the end will do more harm than good.

The scope of this little work does not permit me to give cases that I have treated and cured or benefited by the syrups of hypophosphites; but later, as an appendix to it, and when the time will permit me, I will give a detailed record of more than one hundred and fifty cases that have been under my observation; but *never have I, nor will I, use a combination of the two salts.* In my opinion, and in my experience, they are *more injurious than beneficial.*

Make a careful observation of R. W. Gardner's syrups, employed separately and

according to the case in your hands, using the modified doses as herein suggested, and you will soon be convinced that while, *a priori*, the effects may not be so brilliant, yet the attainment of the end you have in view will be, at least, *sure*.

In a letter Dr. de Bremon gives his opinion upon doses as follows:

"Having had a very long experience in the use of Hypophosphites, and having carefully watched their effects in the treatment of phthisis, I take the liberty of giving you my views respecting the doses best adapted to the treatment of this disease. But while I differ with you in regard to doses, I must recognize that, as a chemist, you have done a great service to the medical profession. Your salts are pure; and the elimination by you of all impurities, many of them dangerous, has put in our hands preparations upon which we can rely for good therapeutic effects. But I consider it of great importance in this disease that certain doses should never be exceeded. I have observed that when given in certain definite quantities per day, the results are steadily and permanently favorable, though somewhat slow; but when the dose is increased beyond those limits, while the immediate effect is frequently surprisingly favorable, the ultimate result has been the production of certain pathogenic and physiognomic symptoms, epistaxis, and, frequently, hæmoptysis, owing to an excessive absorption of the remedy.

The salts to which I wish particularly to call attention, being those which I almost invariably use in this disease, are the salts of lime and soda.

Hypophosphite of Lime is generally used only in the second and third stages of the disease. This salt produces with much energy the undesirable results I have alluded to when pushed too far.

Hypophosphite of Soda is employed in the first stage of the disease; its effects are slower than the lime salt, but more sure when given in quantities of ten grains or fifty centigrammes per day; but in larger quantities it will produce the same effects as the lime salt, and instead of proving beneficial, will accelerate the process of softening by excessive activity.

I would therefore discriminate, when the lime or soda salts are used in phthisis, between adult males, adult females, children (males and females), and infants. The following doses are those which I have found to act the most favorably:

Adult males, 6 to 10 grains per day. Adult females, 4 to 8 grains per day. Children 7 to 15 years, 1 to 5 grains per day. Infants, 1-5 grain per day.

Now, as your syrups of these salts are each twenty grains to one fluid ounce, these quantities will be approximately met by the following quantities, viz:

Adult males, one teaspoonful, two to three times a day.

Adult females, one teaspoonful, two to three times a day.

Children, 7 to 15 years of age, ten to forty drops, three times a day.

Infants, two drops, three times a day.

Dr. Churchill himself has tried greater doses than the above, but having found it too much, has never since exceeded ten grains, or fifty centigrammes, per day. I would also allude to the necessity for physicians to watch for spermatorrhœa as a result of a too free use of these salts.

Hypophosphite of Iron.—The dose of this syrup mentioned by you (dessert spoonful) I consider normal, as it will be used by all competent physicians in cases where the combined action of phosphorus and iron is needed; for my part I have almost always been pleased with it in anæmia, chlorosis, and more especially in dysmenorrhœa, where the combined action of the two has a very direct influence upon menstruation.

Hypophosphite of Potassa.—As this salt is never employed in phthisis, and only for the resolution of old phlegmasias, the dose, one dessert spoonful (four grains), is good; nevertheless, it might be increased in the treatment of asthma to twenty and sometimes twenty-five grains per day, especially when the disease arises from chronic bronchitis, and no symptoms of tuberculosis exist.

I am glad to notice that you are making an elixir of Hypophosphite of Quinia; this is of great advantage in combatting intermittent fevers. It is used very effectually in the French colony of Algiers, and is given in nearly all military hospitals in preference to the sulphate, the doses required being less."

NOTE.—It should be remarked that the Hypophosphite preparations used in the following cases were those prepared by R. W. Gardner, New York.

THREE CASES OF PHTHISIS PULMONALIS,

TREATED SUCCESSFULLY WITH HYPOPHOSPHITES.

TYPICAL CASES SELECTED AT RANDOM TO ILLUSTRATE METHOD OF TREATMENT.

BY THE LATE L. DE BRÉMON, M. D., NEW YORK CITY.

(Reprinted from the *New England Medical Monthly*, May, 1882.)

Phthisis Pulmonalis in the First Degree.—Cure—Time of Treatment.

Four Months.—CASE I. Mrs. L., aged 32, residence, Brooklyn. This lady was advised by her physicians to spend some time in Germany, her native country, in the hope that the change of climate would stop a beginning phthisis pulmonalis. She was absent accordingly from May, 1879, until October, same year.

When she returned to America, there was no amelioration of her condition, on the contrary, her cough was more persistent, her appetite nearly gone, and she was much troubled with sleeplessness and night sweats.

I saw her at the latter end of October for the first time.

On examining her chest, I observed on the left side, in the supra and infraclavicular region, a well marked dull sound, and also a notable diminution of the respiratory murmur, with slight crepitation (crackling noises). In the rest of the side the breathing was generally exaggerated (overstrained.) Pulse 90; temperature $98\frac{1}{2}$ at the time of the examination. Amenorrhœa and very profuse leucorrhœa.

The right lung was normal.

Diagnosis.—Dry tubercles at the upper extremity of the left lung.

Treatment.—Dessert spoonful of the syrup of Hypophosphite of Soda (five grains) twice a day at meal times.

A week later, I saw my patient again. Her cough is less troublesome, her appetite has increased, she sleeps better, and her night sweats less profuse. Same treatment.

In another week the amelioration was progressing without notable change. Same treatment for a fortnight.

At the end of this period my patient called. She told me that her appetite had augmented notably, her cough was decreasing rapidly, and night sweats nearly disappeared. Pulse 80; temperature normal. Same treatment for the next fortnight.

Two weeks afterward, I saw her again; her general state had greatly improved; she was growing more fleshy. On examination I ascertained a very marked diminution in the crepitations which I had at first observed, the breathing was less exaggerated; the dull sound, although weaker, still existed.

Same treatment for a fortnight.

At the end of this time the general condition was progressing, her cough had subsided, her appetite was good, and the night sweats had completely vanished.

Same treatment for the next month.

When my patient visited me again, her general appearance had undergone a complete change; her health was quite satisfactory, all the symptoms of the disease had

disappeared; menstruation had become regular, although leucorrhœa still persisted, for which I ordered:

R. Zinci sulph. pulv.; Acid Tannici, aa 3 ij.

M. Ft. chart. No. xvj.

One powder to be dissolved in one pint of tepid water, and taken by injection (per vaginam) morning and evening.

On examination, the chest on percussion sounded well; all dullness had disappeared. On auscultation, I could find no more crepitation in the upper part, breathing had become normal, although a very slight noise was yet noticeable at the expiration.

I ordered the treatment to be continued as a prophylactic, and reduced the dose to one teaspoonful (2½ grains) of the syrup of Hypophosphite of Soda at each meal (breakfast and dinner). Five weeks later I saw my patient again. The general state of her health was as satisfactory as at the time of our last interview, and the slight noise noticeable at the time of expiration quoted above had entirely disappeared; no more leucorrhœa.

My patient was discharged cured, but as a prophylactic measure I told her to take one teaspoonful of syrup of Hypophosphite of Soda daily, and continue for a period of about six months.

I know that at the present moment Mrs. L. enjoys a perfect state of health.

Phthisis Pulmonalis in the Second Degree—Cure After Six Months, Treatment.—CASE II.—Mr. S., a resident of New York, æt. 19, came to see me. His medical adviser, who occupies a prominent and well-deserved position in this city, had told him that one of his lungs was badly diseased, and that he was of opinion that his patient be treated with cod liver oil and phosphate of lime, emulsified, for which he accordingly prescribed.

Mr. S. tried hard to follow the directions given, but each time his stomach rebelled, and finally rejected the medicine.

He was then sent to me.

He had complained for about eighteen months of a harsh, dry cough, and for two or three months he coughed a great deal before going to and rising from bed; had lost a good deal of strength, and was becoming very much emaciated; he thought his mother had died from consumption.

April 25, 1879—Cough every morning with expectoration of mucus, tinted with blood; night sweats; appetite sufficiently satisfactory; pulse 95; temperature 100½; the patient complained of a pain in the back, level with the angle of the right scapula, and a shortness of breath when walking.

On examination, I ascertained a well-marked dullness under the right clavicle over a space of about three centimetres.

The resonance of the left side was normal.

When I performed a rather deep percussion on the right side, my patient complained first of a sudden violent pain, and then fainted, which state lasted five minutes, his face turning pale and assuming an expression of terror, while thick drops of cold perspiration appeared on all its surface. I was compelled to put off my examination until the next day.

When I resumed it expiration was weak in the upper and fore part of the right lung.

The voice of my patient echoed, especially in the region under the right clavicle; on the left hand side, fore region, his respiration was exaggerated; on the right side, towards the rear, the resonance was much less powerful, and breathing very weak in the infra spinal fossa.

Level with the spine of the shoulder blade (épine de l'omoplate) I observed several crepitations of a humid character; in the rest of the lung, breathing was very faint, and the voice sounded very strong.

Treatment.—One dessertspoonful of the syrup of Hypophosphite of Lime (5 grains of the salt) at breakfast and dinner, daily, for eight days.

At the end of this period the night sweats had greatly subsided. Same treatment for eight days more.

On the 12th of May my patient was progressing favorably; he said he was less suffocated when walking. On the 19th, no change; general state was improving. On the 28th, on auscultation, I found that I could hear the expiration better in the right side, although the crepitation had not entirely disappeared and the voice was less sonorous.

To the right, under the clavicle and toward the external extremities of the latter, the resonance was somewhat less than on the left side.

In the fore region it was nearly equal on both sides; however, to the right the voice was a little more sonorous than to the left.

To the left, towards the rear, breathing was somewhat exaggerated; to the right, in the infra spinal fossa, I heard at intervals a few crepitations. In the rest of the lung it was normal. A faint echo was audible, however, level with the spine of the shoulder blade (*épine de l'omoplate*).

I reduced the dose of syrup (this time of soda) to one teaspoonful, morning and evening, and advised my patient to spend a month in the country.

When he returned to New York, in July, he felt all right; he was strong; no cough; no night sweats; no dyspnoea. All the general symptoms had vanished.

I ordered for two months more the treatment above described, as a prophylactic, viz., one teaspoonful of the syrup of the Hypophosphite of Soda (2½ grains).

Mr. S. came to see me later on, calling my attention to a slight touch of spermatorrhoea.

As to his recent state, he told me he had never given it a thought since, as he had nothing to complain of.

I have seen him since nearly every month in social relations, and his health is in perfect order.

Phthisis, First Stage, Turning to Second.—Three Months' Treatment.—Cure.—CASE III. Miss S., aged 19, born in New York. Expectoration, cough, night sweats, dyspnoea, nearly complete loss of appetite, emaciated, no sleep, palpitation, amenorrhoea. She had begun coughing about four months before.

The family physician had been sent for, had diagnosed incipient tuberculosis, and had prescribed cod liver oil, cream and whiskey. This treatment had given no relief to Miss S.; her stomach rejected the oil.

I was then invited to see her, and the following were the symptoms: Complexion generally pale; cheeks somewhat red; emaciation considerable; prostration intense; expectoration not very abundant, somewhat pearly and mucous, and totally different from that caused by bronchitis.

Right lung in the fore region, to the right and in the upper part, the dullness on percussion was not very strong in the lung from its lower extremity up to the summit; breathing was weaker than on the left side; also several crepitations audible at its basis and right side.

At the rear, in the inferior portion, I ascertained the existence of very notable crepitations of a hurried character; these were very strong and increased at the time of coughing. To the left, both in the fore and rear region, the respiration was a little exaggerated.

Left lung perfectly healthy.

I prescribed syrup of the Hypophosphite of Lime one teaspoonful in the morning and one desert spoonful in the evening, at meals (about eight grains of the salt daily); added to this I prescribed a potion containing one-fourth grain of digitalis to the teaspoonful, in mucilage, to be taken only when palpitations were too troublesome.

This treatment commenced on the 8th of March, 1890.

I saw my patient on the 15th; her appetite was better, cough had decreased; night sweats less abundant, and respiration easier.

Same treatment during eight days.

On the 23d.—No change worth mentioning.

On the 29th.—Appetite restored; sleep quite satisfactory; no more palpitation.

Same treatment for one week, omitting the potion with the digitalis.

April 9th.—Progressing condition; hardly any more cough. I reduced the daily dose of syrup of the Hypophosphite (this time substituting soda for lime) to a teaspoonful morning and evening.

I was called April 13th.—Less satisfactory state; cough somewhat stronger. Miss S. confessed that she had imprudently gone out on a wet day and had her feet soaking wet.

I increased the daily dose to one dessert spoonful of syrup of Hypophosphite of Soda, morning and evening, for one week.

April 19th.—Patient better; no bad results from her imprudence; good appetite prevails; no night sweats and sleep satisfactory; reduced the dose of the syrup to a teaspoonful morning and evening.

April 26th.—Menstruation, which had been suspended, was recovered. Same treatment.

May 3d.—No alteration worth mentioning.

The examination which I performed then set forth the following evidence: All the general symptoms of the disease had disappeared; there was no more dullness; no more crepitation at the basis of the right lung, the respiration, however, was still somewhat weak at the front, under the clavicle; no bellows sound in the heart, but the "first sound" was still dead. Same treatment.

May 10th.—Progressing sanitary conditions; Miss S. begins to grow more fleshy, and was able to help her father in his business.

Same treatment.

May 17th.—On examining my patient, I could no longer discover any difference in the respiratory function on either side.

My patient told me that she felt very well.

I advised her family nevertheless to send her in the country, if possible, and to go on with the treatment as a prophylactic, viz.: one teaspoonful of syrup of Hypophosphite of Soda, daily for two months more.

In regard to the diagnosis in the present case, it would certainly, in some respects, be doubted; the crepitations, of a hurried character, were limited to the basis of the right lung, but there was, besides, in all the rest of this organ, a very great diminution of the respiratory murmur, without any hissing sound, or ronchus, and there was also dullness in its upper portion. The considerable anæmia, the night sweats so intense, and the cough and expectoration relatively so insignificant, could not, however, be attributed to plain bronchitis.

TWELVE CASES OF PHTHISIS PULMONALIS,

TREATED WITH HYPOPHOSPHITES.

By W. H. BENTLEY, M. D., LL. D., COLD SPRING, WOODSTOCK P. O., KY.

(Reprinted from the *Med. Summary*, June, 1885.)

I have been engaged in the practice of medicine for more than a quarter of a century. During this period my efforts to manage disease and relieve my patients have been crowned with reasonable success, and been, as a rule, very satisfactory. This has not been the case, however, in the treatment of pulmonary consumption. In this disease, most of my patients succumbed. Cures were the exception, death the rule.

Even then my success was equal to that of any of my neighboring physicians in similar cases—better than that of many—yet I was not satisfied. I all the while felt that there should be, and really was a better method of treating the disease than I had pursued—better remedies than I had prescribed.

The trouble with me was, I did not know them, and did not know how I was to find them out. I sought information in all directions and from every supposed available source. I tried all the remedies and plans popular with the profession, but to lay them aside, leaving me disappointed and sometimes disgusted.

Under the stimulus of such names as F. Hughes Bennett and C. J. B. Williams, I stuck to that huge delusion, cod liver oil, carefully testing its therapeutic properties during a period of five years. This experience of cod liver oil in consumption of the lungs was sufficient. I never could find a good result from its use. On the contrary, its interference with digestion and appetite, and its tendency, likewise, to interfere with elimination of morbid matter, and to create fever and fatty degeneration, are sufficient, in my view to *positively* contraindicate its use. I never saw any good result from arsenic, and iron is nearly always mischievous. Alcoholic stimulants nearly always do harm, and the extract of malt rarely does good. Soured milk (koumis) is positively unworthy of notice.

After the brilliant results obtained by Dr. J. F. Churchill in the Parisian hospitals under the use of the Hypophosphites, it seemed that the key to the successful treatment of phthisis pulmonalis had at last been found. High hopes were engendered in the minds of physicians in regard to the treatment and cure of the disease. These hopes, however, were doomed to many disappointments. These disappointments arose from several different causes.

First.—Many manufacturing chemists, either through ignorance or through carelessness, failed to produce chemically pure salts, and the Hypophosphites to be available, must be absolutely chemically pure.

Second.—The Hypophosphites, as salts, are easily and rapidly injured by age. Nearly all the commercial Hypophosphites are worthless either from age or defective preparation. The writer recently tested eleven samples, purchased at random, all of which were found unfit for use.

To be suitable for exhibition in phthisis, the Hypophosphites should be entirely pure, and they should be incorporated into a syrup as soon as manufactured. Many of the syrups of the Hypophosphites on the market are prepared from imported salts for the sake of economy. In most cases, these salts, if ever pure, have deteriorated by age, hence the prescriber may look for disappointment.

Third.—Manufacturers have mostly furnished syrups composed of from two to half a dozen different Hypophosphite salts, and we physicians have frequently been so inconsiderate as to prescribe them. At any rate, I have, and I have known many other physicians to act equally as unwisely. We did not stop to consider the different actions of the various bases of these salts, as lime, potash, soda, iron, etc., upon the human system, and thus we prescribe a compound of heterogeneous and contradictory constituents, the constituents antagonizing one another. Yet, we would laugh at the fellow who would attempt to lift himself over the fence with the straps of his boots.

Fourth.—When the physician prescribed these preparations with due regard to the physiological effect of each, he was frequently unable, from the great distance intervening between him and his patient, to give the case the necessary attention. Thus, the prescribed dose might have been too small or, what is more usual, too large, or the patient might have an intercurrent attack of some other disease. The last category is quite frequent. One of the great elements of Dr. Churchill's success was due to his continued oversight of his cases, his patients being mostly in hospital. Prior to December, 1883, I had not entertained the views here expressed in regard to the Hypophosphites.

Through the winter of 1883-84 I devoted all my available time to the study of the disease, reviewing, with great care, the various theories respecting its etiology, pathology and treatment.

The result was a determination to thoroughly test the "Hypophosphite treatment." Dr. J. F. Churchill was the originator of this treatment, and it was on the plan pursued by him and his illustrious pupil, the late Dr. L. De Brémond, that I resolved to conduct my experiments.

I opened a correspondence with R. W. Gardner, pharmaceutical chemist, 158 William street, New York, and by April 1, 1884, was in possession of a liberal supply of his various chemically pure Hypophosphite syrups. With these I at once set to work. Before the close of the year (1884) I had treated twelve cases of known consumption of the lungs, mostly taken from the cases of other physicians.

Of this number four died and eight recovered.

These eight are all alive and well to-day (May, 1885). [Still so, November 25, 1885.]

Three of the cured cases were in the excavation stage.

I kept notes of all these cases and had written out a history of each to accompany this paper, but I find that these reports will fill a space twice the size of one number of the *Summary*, and hence, interesting as it might be to both the writer and the reader, the publication of this matter must be deferred.

I have still continued to use the remedies with equal success up to this time.

The results of my experiments may be briefly summed up as follows:

First.—Nearly all cases of phthisis pulmonalis can be cured by the Hypophosphites, if taken in time and properly managed.

Second.—But one of these salts (used in syrup) should be given at a time. By this I mean to say, never give a compound syrup, or other preparation containing more than one of these salts.

Third.—I have found but two of the salts, namely, the Hypophosphite of Lime and the Hypophosphite of Soda, necessary or even appropriate in phthisis.

Fourth.—Watch the cases closely, and be sure not to go beyond what Dr. Churchill calls the physiogenic action.

When symptoms of "overdosing" present, suspend the remedy for a few days, and resume in diminished doses.

Fifth.—Treat any complications that may arise according to indications."

November 8, 1885, the doctor writes: "Thus far I have treated thirty cases during this year (1885); twenty have gotten well and have been dismissed 'cured.' Eight of the remaining cases will get well; one, an old lady, æt. 69, will die, and another may die. I am sure the Hypophosphites are the proper medicines in consumption, but their use requires care and sound judgment."

November 28, 1885, the doctor writes: "In a communication to you under date November 8, 1885, I stated that I had treated thirty cases of consumption with your syrups of the Hypophosphites during the year; that twenty had been dismissed 'cured'; that eight of the remaining cases would get well; that an old lady aged 69 would die, and that another case might die."

Well, the old lady, Mrs. H., did die on the 15th inst. I considered her case incurable on my first visit, July 20, 1885. She was a tall, lean, thin and dark visaged old lady of highly nervous and excitable temperament, and had been confined to her room, and most of the time to her bed, for ten months. There was an entire absence of appetite; all she had eaten for some months had to be, as she expressed it, "forced down." In other words, she had no relish for food. She had diarrhœa, her food being passed in nearly the same state in which it had been swallowed. She had had several severe pulmonary hæmorrhages; her tongue was fiery red; there were exhausting night sweats; and her weak, thready pulse beat 150 a minute.

Auscultation revealed purulent cavities in both lungs, and her cough was almost continuous. She raised, from her lungs, large quantities of purulent matter. Her husband, a chaffy, conceited old fellow, who had read a part of Gunn's "Domestic Medicine," and, withal, had been an army hospital nurse, had been her physician. She had used gallons of whiskey and "bitters," to say nothing of Slocum's thirty dollar invoice of *his* miserable nostrum.

I prescribed Gardner's syrup, Hypophosphite of Lime before meals and Parke Davis & Co.'s Lactated Pepsin after meals. The patient rallied, and was able to be about the house. Late in October, she attempted to bring some dried fruit from a scaffold in the yard. This resulted in a fatigue and a severe "wetting," for a heavy rain fell during the time. She relapsed and gradually sank until death occurred, as stated, on the 15th of November.

The other patient, alluded to as the one that "may die," has so far recovered as to attend regularly to her household duties. She has nearly her usual strength, and has regained her normal weight with an addition. Her cough has also quite ceased.

This case is so remarkable that I desire to give you the details, which I wish you to incorporate in your forthcoming pamphlet, even at the expense of space.

Mrs. A., married, aged thirty-eight, is the mother of four children, the oldest twelve years old, the youngest four. Since the last birth, the mother has been in ill health, the first troubles being amenorrhœa and leucorrhœa. In January, 1884, she began to cough, the cough being more troublesome on retiring at night and arising in the morning. The expectoration was scant and a kind of "frothy mucus," as described. In March, 1884, she had hæmoptysis, afterward frequently repeated. Her father-in-law was a self constituted doctor, who had not even read "Gunn." He assumed charge or the case, and gave her gallons of whiskey bitters, the "roots and yerbs," as he called them, being a medley of nearly everything bitter and repulsive that the forest afforded. Of course this was wholly unavailing. In the winter of 1884-85 she fell in with the advertisement of some city sharper, who said, "I cure consumption," and got fleeced to the tune of forty dollars. Seeing that she grew rapidly worse under the use of this unscrupulous swindler's "stump water," or whatever it was, she abandoned its use. In March, 1885, she had an attack of intermittent fever in the regular daily "shaking ague" variety. She then called in an ignorant Swede, whose meagre medication was of the Homœopathic "persuasion." He treated the case, without benefit, until August 1, 1885. On that day I was called to the case.

I found about the following conditions:

Bowels extremely irritable, every morsel swallowed acting as rapidly as a brisk cathartic. Tongue fiery red and *creased* toward the base; tip sharp and pointed—thickened vertically; pulse 140, and quite weak. (Did not take temperature.) Daily "shake" from intermittent fever. The fever generally went off by a sweat about two o'clock P. M., and there was likewise a profuse colliquative sweat at night.

Leucorrhœa very profuse and extremely offensive, necessitating semi-daily change of linen; patient extremely weak—could not sit up alone.

Lungs.—Percussion sounds extremely dull—amounting to only a mere "thud." Auscultation: The breathing was chiefly bronchial, vesicular murmur nearly inaudible. In left supra-mammary region, over a circular space about an inch in diameter, both inspiration and expiration gave a muffled blubbering sound, revealing a large abscess filled with pus. On the right, exactly corresponding in position, was a similar sound, covering a circular space the size of a silver dime. Over the left posterior surface there was bronchophony, and over the right, egophony. Expectoration was alarmingly profuse.

Pulmonary consumption in the excavation stage was my diagnosis in this branch of the case, and my prognosis was—"INCURABLE."

My first treatment was directed toward the intermittent, the indigestion, and the leucorrhœa, giving only an anodyne cough mixture for the lung trouble. By the end of the tenth day the three first were controlled, and I then gave my attention to the pulmonary difficulty. I prescribed Gardner's Syrup Hypophosphite of Lime, in dessertspoonful doses,* during the ensuing ten days, to be taken after meals—continu-

*While in the above case, dessertspoonful doses seemed to have worked well, it is much larger than Churchill recommends. It would be advisable to limit the dose to from one-half to one teaspoonful in such cases. R. W. G.

ing the cough mixture, so as to control violent paroxysms of coughing, to which she was subject. After ten days of this treatment, the doses of syrup were reduced to one-fourth. She improved continually and rapidly. I saw her on the 27th inst., November, 1885, and she is to all appearances well. Her appetite and digestion are both good, bowels regular, no cough, and her weight is greater by a few pounds than ever before.

She says: "I am not quite so strong as I was before my sickness, and I am a little short of breath in going up hill or up stairs." I give her words.

I feel that in placing your "chemically pure syrups" in the hands of the medical profession, you are a real benefactor, and I want to aid in bringing them into general use.

Dr. Aureliano Maestre, de St. Juan, *Prof. of Clinical Medicine, Univ. Grenada, Spain*, gives the following as his conclusions, after testing the Hypophosphites in phthisis:

First.—"The Hypophosphite of Soda or Lime must be perfectly pure. This is one of the causes of the advantageous results I have obtained.

Second.—The Hypophosphites must be given when tuberculosis is, so to speak, in an isolated state.

When it is complicated with an accidental inflammatory state of the respiratory apparatus, this treatment, as we have seen, aggravates the condition of the patient, in such cases it must be immediately omitted, and again resumed as soon as the complication has disappeared.

Third.—In the treatment of pulmonary phthisis the Hypophosphites should be given alone, and without any other pharmaceutical preparation, otherwise their action will be impaired or prevented.

Fourth.—The dose of Hypophosphites must not exceed a certain limit, beyond which they are likely to produce unfavorable results. The alkaline Hypophosphites are the best preparations hitherto known for the treatment of tubercular phthisis."

Dr. Parigot, *Prof. Univ. Brussels*, says in "*Journal de Médecine de Bruxelles*."

"I must say that I have only been completely successful when I was certain that the remedy was perfectly pure. * * * When the effects of the treatment have been once established, and the improvement of the patient has become well marked, I have often left off the use of the Hypophosphite of Lime for a few days, and have tried other modes of treatment, such as antimonials, opium, cod liver oil, either alone, or alternating with the Hypophosphites, but I have always been compelled to revert to the specific treatment, and have found the patients the better for my so doing.

So far the treatment has not failed me in a single case."

Dr. Reinwillier, Paris, (*Courrier de Paris*,) says: "In the presence of the admitted inefficacy of all former modes of treatment, I wished to make my experiments according to the rules laid down by Dr. Churchill, and to my great joy, almost against my own expectation, I succeeded in my first two attempts."

Six months later the same author writes:

"Some months ago I mentioned the success I had obtained in the treatment of consumption by means of the alkaline Hypophosphites, and stated that I had undertaken a series of experiments upon a large scale, and would make known the results. I am now able to redeem that promise.

I have collected a large number of observations, some of cases treated by myself, the rest from the practice of other physicians, and I may state that the phosphorized treatment, has been found useful in almost every instance. Not only have consumptives been cured in the first period of the disease, but also a large number of those who have gone through all the stages of this terrible malady."

J. R. Fraker, M. D., *Marlboro, N. Y.*, under date of April 1, 1884, writes: "Through your kindness I obtained one single bottle of your syrup of Hypophosphite of Lime, with the view of securing its effects upon a boy eighteen months old, who had the peculiar eruption and enlarged lymphatic glands from birth, which were entailed from tuberculous parents, and said to have resisted every effort at amendment both internal and external. On coming under my care, I forbade the use of all other remedies,

and began the use of syrup of Hypophosphite of Lime prepared at your laboratory in doses equivalent to half a grain of the salt, three times a day. Before the bottle was half used, the boy had lost the characteristic shiny, pinched and pale expression, his appetite returned, the drowsiness disappeared, and cell nutrition had so improved that the eruption gave way to the healthy appearing cicatrix. No untoward complications were suffered from its administration, as might be apprehended from discutients in metastasis to the lungs, brain, peritoneum, or any serous tissue. On the whole, I regard the Hypophosphite of Lime as among the most valued combinations of phosphorus."

On Oct. 8th, 1884, the same gentleman writes:—I will now add that I have had the Hypophosphite of Lime on trial since April, 1884, in numerous cases of lung difficulty, and in all, so far, have found it eminently satisfactory.

I am now using it in both acute and chronic pulmonary diseases, and where the lung is not broken down by intense ulceration and supuration, and tuberculous matter, it seems to arrest the morbid process. I believe it to act as a powerful promoter of tissue change, and when it fails to accomplish the restoration of the lung, it may be due to deficient excretion of waste products when the retention acts injuriously, poisoning the system through absorption. This indication might be met by a diuretic eliminator to aid its removal. With this, the power of tissue change would be increased, multiplying the products of meta-morphosis, which result from the oxidizing effect of the remedy, giving increased appetite and fresh nutriment for the tissue, and thus act as a true tonic.

Of the twenty-eight or thirty phosphorus compounds, I regard the Hypophosphite of Lime as decidedly the more efficient in its physiological effects. * * * Hoping to give you many pleasant reports, I am yours, with many congratulations for your therapeutic success."

S. T. Lowrie, *Lore City, Ohio, May 28, 1884, writes:*

"I received a small pamphlet from you some few weeks ago, in regard to Dr. Churchill's modes of using Hypophosphites, and also in regard to the necessity for their purity, etc.

Having abandoned the use of Hypophosphite compounds as worse than useless in tubercular diseases, I nevertheless concluded to try your preparations.

The result has been so satisfactory that I am perfectly delighted over their use "

ARE HYPOPHOSPHITES OF VALUE IN TUBERCULOSIS?

By WILLIAM PORTER, A. M., M. D., St. Louis, Mo.

The discovery of the characteristic bacillus of tuberculosis and the acknowledgment of its importance as a factor in the progress of the disease, has led many practitioners into a mistake. Their error is this. They have concluded that, since tubercle is a specific disease, depending upon the presence of the bacillus, therefore to kill the bacillus is to cure the patient. Hence the long array of germicides and the different methods of introducing them into the system, some of them valuable, but not sufficiently so, to justify entire dependence upon any one or all of them.

Away back of the specific germ—long before the bacillus has had the opportunity to invade and multiply in the tissues, we have a letting down of vital force—a depreciation of the power of resistance, or, as we are now told, a cell deterioration. I fully agree with Cohen, that, "The condition which makes the human tissues a receptive 'soil,' a favorable 'culture medium' for the tubercle bacillus—that condition which of old was called 'diathesis,' and now 'susceptibility,' is itself a disease, a departure from the norm; and I believe it to be the most important element in the morbid complexus,

termed tuberculosis. It is the element requiring the greatest care in prophylaxis, the most intelligent and faithful treatment. Independently of the invasion of the microbes associated with tuberculosis, there is a disease to be treated, and if this disease be successfully treated, the microbes will come and go harmlessly."

Jaccoud has condensed the idea of this physical degeneration—or defective nutrition into one word, "hypotrophy," "a defect in the constructive or tissue building powers of the system." Upon its recognition much depends. Certainly to antagonize the specific germ and ignore the fact that the tissues are in a receptive condition for a new invasion is a poor practice—yet we believe, a practice that is earnestly followed by some.

Dennison, in a paper in a recent number of the *Philadelphia Medical News*, while advocating the use of tuberculin, insists that the action of the healthy living cell, is in exact harmony with the tuberculin, and that one directly antagonizes the bacilli—the other prevents their reproduction and effects repair.

Without fear of contradiction, it may be asserted that tissue building—the establishing of healthy cell life—is the foundation treatment of every case of tuberculosis, not only in the incipency, but in the advanced stages as well.

This proposition is not antagonistic to the germ theory; rather has the knowledge of the existence and important role of the bacillus, led us to a better understanding of the necessity of proper nutrition.

Nutrition is a *sine qua non* in all cases of tuberculosis. In some cases its necessity is more evident than in others; in acute cases, other needs may be more urgent, but the rule holds good, the tuberculous must be nourished. In "thin living and thick dying" we find tuberculosis a connecting link. Many accept this theoretically, but put it in practice but poorly.

Feeding is not nutrition. The best of diet may not be assimilated—may do harm rather than good. The practice of stuffing, so honestly advocated by some authors not long ago, has been rapidly abandoned. Years ago every case of phthisis got a bottle of cod liver oil; now it is given only to selected cases. Nutrients are chosen which can be appropriated and food is given in such a manner and of such kinds as may easily induce complete assimilation.

There must be a demand for nutrition before assimilation can be satisfactorily performed. There must be the ability to appropriate food that is taken, else the defective cell in a remote part of the system will profit little thereby. Just here, I believe is an important point in the treatment of tuberculosis. The best of food and the most reliable nutrients are taken, and still the waste in many cases goes on. There is either want of assimilation or a want of gain from the process.

There is need for "respiratory food" as well as that in the alimentary tract. Oxygen must be taken into the system and the cells empowered to use it in the nutritive changes which we aim to accomplish by proper feeding. Deep breathing—pneumatic devices, and the inhalation of oxygen may do much to support this element of nutrition, but not infrequently the system seems as unable to appropriate oxygen as it is to utilize the food which passes through the stomach and intestines. Whether the lessening of tissue oxidation is due to a diminution of oxidizable phosphorus [Churchill], or to cell change, or to some other cause, the lessening of nervous energy is certainly a factor in the hindrance of oxidation and consequently of assimilation. Indeed, some authors (Holland and others) claim that pulmonary consumption is a neurosis. At any rate, if oxygen gets no farther than the alimentary tract, there can be no assimilation, no building up and tearing down, no hindrance of destructive change and repair of injury.

To meet the conditions clearly indicated by poor assimilation and loss of energy so often found even in incipient tuberculosis, and for the reasons suggested above, I formerly prescribed one or another of the several preparations of the Hypophosphites. In some instances the result was good, and in others I was disappointed. My experience led me to believe that the Hypophosphites as ordinarily used, did not constitute a very reliable remedy.

I am now sure I made a mistake. For two years I have been using the *single* salts, chemically pure, as prepared by Mr. R. W. Gardner, and am convinced of this—that while oftentimes in non-tubercular cases, the different salts may be given together for tonic effect, their combination should be avoided in phthisis. Quoting from "Hare's Therapeutics, Vol. 1, p. 847:" "The Hypophosphites of Lime and Soda are of service (in tuberculosis) as general tonics. The various wonderful complex proprietary Hypophosphites are less useful."

I would go further than this and use the Hypophosphite of Soda alone in cases where a direct tonic is needed, especially if the expectoration is tenacious. In combination with a suitable nutrient, it is especially applicable where there is destructive change going on in the lung. I have failed to notice increased temperature or excitability from the administration of this salt, a result not infrequent when the compound salts are given.

Where the expectoration is very free and exhausting, I have fancied that it was lessened when the lime salt was substituted for the soda. Be this as it may, it is well recommended to use the Hypophosphite of Soda for tonic effect, where the expectoration is not too free, and to replace it by the lime salt if the expectoration is excessive. The indications for the other salts are equally plain. The Hypophosphite of Potassium, where a tonic resolvent effect is wanted, but it must be remembered that in phthisis, rapid resolution is sometimes dangerous. The Hypophosphites of Iron or of Manganese may be safely used in incipient cases, especially where there is marked *anæmia*.

I endorse the proposition made by many authors, that the Hypophosphites are valuable aids to oxidation and assimilation in tuberculosis, but submit that one salt when properly selected, accomplishes more than when a combination is used, in addition to which it is safer and its use more rational. I might cite a number of cases from my note book confirming the conclusions above given; indeed, these conclusions have been made from the evidence offered by these cases. They must be taken for what they are worth. To me they suggest a better method of administering a class of remedies of known merit and in general use.

NOTES OF A CASE OF INCIPIENT PHTHISIS SUCCESSFULLY TREATED WITH GARDNER'S SYRUPS OF HYPOPHOSPHITES.

BY MALCOLM GRAHAM, M. D., JONESVILLE, MICH.

Mrs. B. American, aged thirty years, mother of several children—has gradually failed in health since the birth of her last child. Has a bad cough, night sweats and entire loss of appetite; has lost many pounds in flesh. There is some dullness at apex of right lung. The liver is three fingers wide, and there is constipation alternating with diarrhoea.

I immediately put her on Gardner's syrups of Hypophosphites, with such intercurrent remedies as the system demanded.

There was an immediate change for the better. The first improvement noticed was in her cough, then her appetite increased and there was no more loathing of food. In a short time she had ceased to sweat at night. Indeed, there was such a steady and permanent improvement in this, and in similar cases treated since, that I feel it my duty to recommend these Hypophosphite syrups in all cases of consumption, but especially in the incipient stage.

Let me speak of the further use of these syrups of Hypophosphites in coughs, not ordinary coughs, but those racking, nervous ones, with little or no expectoration,

except early in the morning. They upset the patient's stomach, spoil his sleep and are the *bête noir* of the medical profession—at least I have found them so until I used Gardner's syrups of Hypophosphites.

July 5, 1890.

PHTHISIS.

BY J. C. WILSON, M. D., MORLEY, N. Y.

I must say that I am greatly pleased with results obtained from treatment of a number of cases of phthisis with your syrups of Hypophosphite of Soda and Hypophosphite of Lime.

Several cases of phthisis in first stage have come under my observation in the past few months, and in every case there has been no failure as far as I could learn; and, at any rate, there was so great improvement at once that most of them went from my care apparently cured.

"Was called to attend Mrs. L.—— in premature child-birth January 26th.

Had never seen this woman before; was requested to examine her lungs on February 1st. At this time she was greatly emaciated, had an exceedingly bad cough, no appetite, with sleepless nights on account of cough. She told me that she had been coughing for over a year, and had gone through the usual treatment for phthisis and been "given up" by several physicians. My examination showed excavation occupying nearly the whole left lung, slight dullness over and just below right clavicle, other signs normal in right lung.

At this time, February 1st, there was, as mentioned, extreme emaciation, profuse expectoration of a muco-purulent character, no rigors or night sweats, some fever with loss of appetite and extreme prostration.

One-eighth grain doses of morphia at night were given at this time, which allowed some rest from the harassing cough. Hypophosphite of Soda (Gardner's syrup) was commenced in dessertspoonful doses three times a day.

February 9th—Considerable improvement in strength of patient, but no gain of appetite, and the morphia was taken away from her this day. Patient passed two dreadful nights, but on the third day appetite returned, and she has had a good one ever since, to date, June 26th.

February 14th—Says cough and expectoration are less, a little stronger, able to sit up in a chair for an hour or two, sleeps well and appetite good; treatment same.

February 20th—She says she feels stronger, but sees no change otherwise; cough and expectoration same as at last visit.

February 26th—No change in symptoms, and this day the syrup Hypophosphite of Lime was substituted for the Soda, dessertspoonful doses.

March 1st—Found her in a greatly improved condition as to strength; able to sit up all day, with strength to take considerable exercise about the house; cough and expectoration much less, no great gain in weight.

April 1st—Seems to have been a steady gain since last visit in all symptoms except no increase in weight. Treatment, Hypophosphite of Lime (Gardner's syrup) one teaspoonful three times a day.

June 26th—Examination of lungs to-day shows continued excavation of left lung, no abnormal signs about right lung, all dullness having disappeared.

Results of Treatment.—Nearly entire cessation of general symptoms, though from her being from a child frail, we could not hope to make a strong woman of her. She now goes some distance away, so that she will be out of my observation for some time. She is directed to continue same treatment, viz., teaspoonful doses of syrup of Hypophosphite of Lime three times a day.

She has within the last two weeks gained several pounds in weight and has some courage, the lack of which has been a sad drawback all through the treatment of the case."

October 29, 1891, Dr. Wilson writes: "Had I known that my notes would have been of use to you, I could have saved the record of many interesting cases treated in the last few years with your preparations.

One was a case of undoubted tuberculosis—pulmonary—which was treated with the syrup of Hypophosphite of Soda, the case being in the first stages.

This young lady was cured of the lung trouble, but after two years of good health the disease comes back on her in the form of a tubercular disease, affecting the lower end of the left humerus and the lower part of the spinal column.

Had I made notes of the case, it would have been interesting for many reasons; one, especially, the certain character of the lung trouble, and that both from the symptoms and the family history, viz., death of the father from tuberculosis and of one sister since the time I first saw this case."

PHTHISIS, ASTHMA.

BY P. J. BAILEY, M. D., DAWSON, KY.

I have been using your syrup of Hypophosphite of Soda and syrup of Hypophosphite of Lime in cases of phthisis pulmonalis, and your syrup of Hydriodic Acid in asthma, with success. I have at this time five cases of phthisis pulmonalis, all improving when last seen.

CASE I.—Is about well; he is going about attending to his ordinary duties. This was a case of four years' duration. He is well except a little cough in the morning and a slight shortness of breath when walking up hill.

Previous to treatment he had five or six hæmorrhages from the lungs, and has distinct cavity in right lung. I have never given more than seven and a half grains per day, and but one salt at a time, and have never produced pathogenic effects as yet.

CASE II.—Asthma. Lady aged 23 years; duration, from childhood; worse when catemania appeared; disease of a spasmodic character; attacks about every two weeks, and lasted from one spell to another, but very bad only for two or three days.

She has had only one slight spell since treatment and is now quite well, has gained eighteen or twenty pounds in weight and gone to work after being helpless for four or five years. I consider your syrups, used according to Churchill's methods, the only treatment offering the slightest hope of success in consumption.

I shall use your syrups and no others unless they fail me in the future, for I have nothing to fall back upon that would afford even temporary relief. I congratulate you upon the high character and chemical purity of your preparations."

PHTHISIS.

WALTER M. DARNELL, M. D., BELTON TEXAS.

"I have used three bottles of your syrup of Hypophosphite of Soda in a case (phthisis) and am glad to report steady improvement under its use, though it has not been used long enough to say with certainty what amount of benefit will finally be derived.

I have used three bottles of syrup of Hypophosphite of Lime in an old chronic case in my practice, and I must say with the most flattering result, the patient having gained fifteen pounds in weight in ninety days."

NERVE FEEDING.

BY THE LATE WILLIAM F. HUTCHINSON, M. D., PROVIDENCE, R. I.

(Published by the *New England Medical Monthly*, December, 1892.)

I am desirous of placing on record the experience of a few years past in that branch of therapeutics which I have for some time designated by the title of this paper.

If the nervous system is sufficiently normal in status to assimilate for ordinary food its special pabulum, and waste is duly balanced by repair in the correct way, there is nothing to say. Were this specially happy condition common to modern mankind, neurologists would forthwith adopt some other way of earning a livelihood, and their example would be followed by a large majority of their colleagues.

Unfortunately, such delightful prospect is nowhere in existence; on the contrary, human nerves grow more and more demanding, respond more slowly to treatment, and grow old faster with each ten years of advance in the push and hurry which characterizes the epoch in which we live. So we are compelled to seek in every direction for such forms of artificial or concentrated food, as will supplement that ordinarily consumed, so as to make up deficiency in nervous supply, and keep our patients going.

They will not lead normal lives; to rest they are not inclined; to stop and be still for a year is simply out of the question.

In every case of nervous insufficiency, a term which I prefer to Beard's word "neurasthenia," there is a failure of digestion. Certain foods do fairly well; but they are void of principles needed for nervous supply. There is even a steady increase in weight with many of these sufferers; and some of the most hopeless of my patients who are nervously insufficient, are fine looking, buxom persons, who get no credit from friends as invalids, and who suffer almost as much from the derision of those dear to them, as with their physical disease.

All the time there is a steady loss of resisting power; resiliency is more and more impaired, and while no actual organic disease of centres can be detected, there is a profound malaise, an increasing lack of tone, which subjects the unfortunate invalids to more severe discomfort than many whose days are numbered by organic central decay.

I have of late found it best to direct the diet of these patients with rigid care, and to arrange it in such proportions of oxygen and nitrogen that the former shall be considerably in excess, watching excreta carefully to learn if one or both are assimilated in excess, and supplying deficiencies that arise by addition of what is needed. While kidneys continue to eliminate phosphates largely, and the patient steadily loses ground, for example, it is necessary to supply phosphorus, or stop waste thereof. I have more than one case at present where I have vainly attempted to arrest such large proportion of urinary phosphates, and have been forced to supply the loss by adding phosphates to daily food. In one of these patients, there had been for years a steady loss of nerve tone, an increasing insufficiency, accompanied with sciatica and general debility, without loss in weight and careful measurements fail to show any decrease of muscle strength. Yet there is a sense of inability to conduct business, a feeling of fear of unknown or impossible occurrences, and steady mental depression which is far harder to bear, than actual organic disease, and Mr. B., is an object of pity. Urinary analysis gives a specific gravity of 1008, and the sole abnormality present, a steady excess of earthy phosphates.

Now it is my opinion that when such waste cannot be arrested, and I have thus far failed to do so with Mr. B., the only other way of meeting the loss is by artificial supply, and the question arising was what preparation of phosphorus to employ. I have found the element itself so difficult of combination in stomachs weak in

oxygen, that I have abandoned its use, and for years was in the habit of employing metallic phosphides, until I discovered that these two were rarely well borne, and have finally decided upon preparations of Hypophosphites as at once most agreeable, most readily assimilated and most efficient. It is only necessary to have them fresh, for all these oxygen compounds decompose more readily than most other preparations. This quality of stability I have found more to be depended upon with Gardner's syrups of Hypophosphites than with any other, and am so contented with results obtained with his goods, that I use no other.

They are palatable, efficient and reasonable in price. I am amused sometimes at the remarkable swiftness of their physiological action. One of my patients, a nervous lady from Georgia, comes to my rooms daily in depths of despair; "Doctor" says she, "I might as well give up and go home, I have been worse than ever, and want to cry all the time. Oh! what shall I do?"

My assistant brings her a dose of Hypophosphites, she drinks it, and in half an hour is smiling, bright and quiet again, ready for her electrical seance, and all right for another day.

And this is not a singular case.

I am glad to say these few things to my colleagues who are not specially familiar with the action of Hypophosphites in nervous diseases, and heartily recommend them to give the remedy a trial.

DENTITION.

BY C. C. STEPHENSON, M. D., LITTLE ROCK, ARK.

"I have used your syrup of Hypophosphite of Lime in the case of Little Effie B., who has suffered greatly with difficult dentition. Cutting teeth has been slow and painful to her, but since taking the lime her teeth have come through without any trouble. The diarrhoea attendant with dentition, I find is no trouble while taking the lime. The therapy of your lime is undoubtedly as you give it."

THE SINGLE HYPOPHOSPHITES IN DEFECTIVE NUTRITION OF BONE AND NERVE TISSUES.

BY LEWIS G. PEDIGO, A. M., M. D., CROCKETT SPRINGS SANITARIUM, VA.

(Reprinted from *Journal American Medical Association*, Jan. 20, 1894.)

Of all the varied uses of the Hypophosphites, none are more interesting to me than their employment to meet certain faults of nutrition in the osseous and nervous systems. I group these two departments of the human organism roughly together here, because my attention was directed to them in this connection by certain rational considerations. In the chemical constitution, the growth and maintenance of both, phosphorus plays a very important part. So it was inferred that in certain pathological conditions of either, especially when characterized by defective nutrition, the use of phosphorus in some convenient and easily assimilable form, is the primary and essential indication of treatment.

The various clinical trials of this opinion in practice for several years, has amply justified and sustained the inference. My readers are probably familiar with the use of these remedies in cases of delayed teething in children. Aside from this familiar use, my cases have embraced instances of defective bone development in children and a certain low type of subacute and chronic inflammation, occurring in the bony and periosteal tissues of scrofulous or badly nourished patients, as the result of a blow or injury. It must be borne in mind, in these cases, that the predisposing cause is the

state of defective or perverted nutrition. The same traumatism which in such a constitution, would cause a troublesome, tedious and prolonged inflammation, would produce a very slight local effect in a vigorous, healthy subject. The course of such a case under the usual treatment is very unsatisfactory. The periostitis shows little tendency to recover, and the bony tissues, so dependent on healthy action of the periosteum, manifests a tendency to disintegrate. As a result, we have a case of hip-joint disease, or Pott's disease, or some other orthopædic affection, with the prospect of a *long special* treatment, and an endless array of plaster jackets, splints, &c., &c.

Recognizing and appreciating all the good to humanity and to science that has been accomplished by the modern orthopædic surgeon, (and it is much,) it is plainly the duty and province of the general practitioner to arrest the progress of these cases in the earlier stage, if possible. In my own experience, the Hypophosphites offer the best means of relief in this incipient period, and, in some cases, almost the only hope of resolution of the inflammatory process. If I might be pardoned the presumption of making a suggestion to a specialist in his own field, I would say to the orthopædic surgeon, that he could not do a better thing, even after this ugly inflammation has reached that stage in which the tissues break down and deformity results, than put his patient on Hypophosphite of Lime as adjuvant to his special surgical measures. Judging by its effects in other fields, and in the first stages of the class of cases under consideration, it would impart more vitality to a failing system, furnish some much needed elements to the organism, and promote healthier action and a tendency to repair in the affected tissues. For obvious reasons the Hypophosphite of Lime is the particular salt to be used in all injuries and inflammations of bone and periosteum.

With no intention of entering into an elaborate review, I recall one case sufficiently typical to exemplify my meaning.

A girl, thirteen years of age, was thrown from a horse, falling on her side, so that the left thigh struck the apex of an angular rock. Some lameness resulted—obviously associated with an injury to the femur near the great trochanter. A slight depression in the bone could be felt at this point. Inflammation, swelling, redness, followed, with considerable deep-seated tenderness and pain on walking. This condition was temporarily improved by counter-irritation—use of iodides and various other remedies. But there was a constant tendency to relapse, especially in damp, depressing weather, with east winds. The case was becoming chronic, the general health failing, the affected parts threatening a chronic abscess, with more or less disastrous effects upon the integrity of the bone and the future usefulness of the limb. The parents were justly and reasonably alarmed, because one bad case of hip-joint disease had occurred in the family, as a result of a similar injury. A scrofulous taint was suspected. The patient was directed to take a teaspoonful of Gardner's syrup of Hypophosphite of Lime, three times a day, with no other treatment, except rest, suitable diet and hygienic precautions. Improvement began with surprising promptness—considering the peculiar nature of the tissues affected and the usually slow processes which characterize them. The most striking feature was the *control of the pain* which the remedy seemed to exercise. Of course this was not a *direct* anodyne influence, but was effected through a modification of the inflammatory processes. The case went on pretty steadily to a good recovery. It is significant that the patient observed the pronounced change in the case as co-incident with the change of treatment, and expressed herself as feeling safe, so long as she was taking this remedy.

As to the other class of cases alluded to above, I shall present the essential history of only one—which is sufficiently typical of a large number, to answer the purpose of illustration.

A child, male, aged sixteen months, was suffering with diarrhoea and indigestion—associated with difficult and delayed dentition. The gums were red and swollen; teeth were developing slowly which should have appeared about the seventh month. The anterior fontanelle was very large, relatively larger even than it should have been at birth, showing retarded and defective development of the parietal and frontal bones

and indicating a general faulty nutrition especially of osseous tissue, both in the foetal and infantile periods of life. The general appearance of the child was extremely bad. It was ill-nourished, emaciated, pale, feeble and irritable, with loose, easily wrinkled skin, and a bad complexion. A treatment was adopted for the temporary relief of the dental irritation and diarrhoea, and a prolonged course of syrup of Hypophosphite of Lime was directed, with no other medicinal treatment. I did not see the patient again for six months. (The family lived some distance away). At the end of that time the mother brought the child to me, not for any professional service, (which was obviously not needed,) but for exhibition. The improvement was beyond all anticipation. The fontanelle was almost entirely closed, the teething process had gone on without irritation of any consequence, and had progressed much more rapidly, and the general condition was so much better, that no one could have identified the child. It was plump, well nourished, of good, clear, rosy complexion, and evidently felt comfortable and in a good humor with the world—a symptom of great significance in these cases.

I have spoken of this case as a *typical* one, meaning that it represents a *class* of cases which in my experience have been conspicuously benefited by the use of the Hypophosphite of Lime.

I must say, however, that the *brilliant results* of treatment in this instance, must not be expected in every case. It is *somewhat* above the average in this respect, and therefore not strictly typical in this sense. But its history exemplifies and illustrates principles of treatment that will hold good in all of the class of cases to which it belong.

Under the second division of my subject, viz.—the use of the Hypophosphites as nerve nutrients, it is my purpose to confine myself to one case, viz., a specific gummatous tumor of the brain.

The patient, a bright mulatto, aged twenty-six, stout and generally healthy in appearance, gave a distinct history of syphilis. At the time he came under my observation he was troubled with aphasia, with partial paralysis on the right side, walked imperfectly—scraping the floor lightly with the sole of the right shoe. He could be sent to take a note, (not a verbal message,) could go to any portion of the town, find his way without difficulty, but could not remember the names of the streets. He was sent after cows on the commons, and he would get the right ones, but could not tell their names, and if he attempted to throw a stone at any of them it dropped within two or three paces of his feet. The left hand and arm were much stronger than the right. He was obstinately constipated.

The case was vigorously treated with large doses of iodide of potassium, and small doses of mercury biniodide, with some attention to digestion and state of the bowels. The iodide was given in increasing quantities until a dose of sixty grains, three times a day was reached. This was continued for a period of about a week or ten days, alternating with short periods of suspension of the remedy.

The effect was good, and improvement began and continued for months; the paresis was better, the mind was clearer and more vigorous; the strength and power of endurance increased, and the aphasic symptoms yielded perceptibly. After some months of this treatment, the case seemed to come to a standstill—the improvement reached a limit. Now it was considered safe to begin a *restorative* treatment, on the theory that the iodide had done its work of liquefaction and absorption of the tumor faithfully and well. The patient was placed on a small dose of tincture of nux vomica, (ten drops) thrice daily before meals, and the effect carefully watched. It produced some irritation of the brain—cerebral hyperemia and evident aggravation of all the symptoms. It was withdrawn promptly and the former treatment resumed for another month—with a few doses of bromide of sodium at first, to control the untoward effect of the nux vomica. After a month the nux vomica was again cautiously tried, and this time with good effect.

The symptoms—mental and physical—all improved somewhat, and no irritation supervened. After a few days another measure was added to the treatment, viz., the use of a teaspoonful of syrup of Hypophosphite of Lime, thrice daily, after eating.

The effect of this step was perceptible in the decided improvement of all the symptoms. I continued the use of the Hypophosphites in this case for several months, watched the effects carefully and with intense interest. I had dispensed from my office only two ounces of the syrup of the lime salt in the first place, so it was soon exhausted. When the patient returned I found I had no more of that preparation, but had a remnant of syrup of Hypophosphite of *Manganese*. I substituted this and found, to my surprise, that it seemed to act more favorably than even the Hypophosphite of Lime. When this remnant was exhausted, I returned to the use of the lime, however, and the patient *noticed the difference* in his condition.

He insisted that I give him "the same medicine that he got the other time," which I did, and with the same result. His neighbors and friends remarked upon the mental improvement—the family reported that he could begin to work better and remember messages more accurately, and the patient said he could "learn and recite his Sunday school lesson better." I had ample opportunity to watch this case closely, and to differentiate the effects of the various remedies used at different times, and my conclusion is that the single Hypophosphites were decidedly efficacious in the latter stages of this case.

The theory which led me to their use may be stated as follows:

In cases of gummata of long standing the contiguous parts of the brain are subjected to constant pressure, interfering seriously, not only with their functional activity—but with the nutrition of the cells and fibres which enter into their structure. After the gummata have been partially or fully absorbed under the influence of the heroic doses of iodide of potassium, so that the brain tissue has the opportunity to expand again to something like its normal size and shape—these depressed, starved and dwarfed fibres and cells need some restorative remedy, some special nerve *nutrient*, to assist in this development. Nothing so naturally suggests itself to the medical mind, for this purpose, as phosphorus in some available form. As the single Hypophosphites is my favorite preparation of phosphorus for almost all its uses, I prescribed them in this case, with the results recorded above.

I have reason to believe the effects can be duplicated in other similar cases.

In an old case, as this was, even when it first came to me, the physician must not expect too much of any remedy. Parts of brain structure have been absorbed under the long continued pressure. Other parts, even though remaining, have been so damaged that their integrity cannot, probably, be *fully* restored, or their functions rendered strictly normal. In conclusion, let me warn any reader who feels sufficient interest to test the matter—not to begin the restorative treatment too early in the development of the case.

ARTIFICIAL RECONSTRUCTIVES.

By C. E. BOUM, M. D., PROVIDENCE, R. I.

(Published by *New England Medical Monthly*, January, 1893.)

It may seem strange that a term like this should be chosen as title to a paper upon the simplest and most obvious forms of chemical foods.

All reconstructives are in a certain sense artificial, when not obtained in the ordinary diets, by which the human race is accustomed to avert the results of destructive metabolic change.

In another sense no reconstructive is artificial when either or any of its basic compounds enters into the normal structure of our tissues, yet, while the accustomed food contains a sufficiency of what is necessary to prolong life, there are times when certain elements in normal combinations cannot be assimilated and a demand is made for extraneous aid. It is then that the judgment of a sagacious practitioner is called upon to decide what portion of the system needs this assistance, needs, in fact, to be reconstructed.

Among the elements that are wasted faster than supplied when the system is below par, are chiefly to be found those which are absorbed with difficulty in normal condition and contained in small quantities in normal food. I refer to the mineral constituents of the blood, which are lost with ease, regained with difficulty. In order that a healthy balance may be reached after it has once been disturbed by disease, it has been ascertained by experience that the lacking material must possess certain qualities in the remedies given in order to assure digestion and assimilation.

These are first, agreeableness to the palate, since nothing is more repugnant or less to be borne than distasteful, nasty medicine. Next, stability of combination, for in what form we administer artificial food it may be kept up for a long time in order to do much good. It must be in concentrated form, as when medicines are to be continued, the smaller the dose the better.

Now let us see for a moment, which of the mineral constituents of the blood are soonest lost and remain longest absent, when the stomach and digestive tract are debarred their use by disease. The rich rose-color of the healthy cheek indicative of free circulation of blood well loaded with iron, slowly gives place to sickly pallor as that metal is withdrawn, while bleached lips and colorless ears bear witness to the loss. Slow, sluggish movements of the body once so agile, of lethargic mental processes in the brain once so quick to respond, together with neuralgic pains flying here and there like red hot arrows, from a heated bow, signal loudly and plainly, disappearance from the economy of its chief vitalizer—phosphorus.

We have essential need of two of our artificial reconstructives, iron for the blood, phosphorus for the nerves.

It is very true that iron is by no means the only constituent of the blood that is withdrawn when disease begins, but it is almost alone in being easily abstracted and slowly replaced. Each inspiration of pure air that fills the lungs oxidizes this metal with which it comes in contact by endosmotic action in large quantities and more rapidly that it can be supplied when absorbents refuse duty or are sluggish. With phosphates the case is somewhat different, they are poured out from the system in increased quantities whenever a slight deviation from normal disturbs equilibrium. It is a common thing to find phosphates in large excess in urine after so small a disturbance as that of a slight cold, their union with the blood being unstable. It is therefore necessary in medicating patients who are anæmic to give such remedies as are properly proportioned, if compound, to the lack of vital stimulants that we believe to exist.

Now phosphorus alone has been found by experience to be illy fitted for continued use, it is neither easily absorbed nor pleasant to take and must therefore be combined with oxygen and water. It is thus that our good friend, Mr. Gardner, prepares his famous syrups of Hypophosphites of alkalies and metals.

Hypophosphorous acid consists of one equivalent of phosphorus, one of oxygen and two or three of water, with a strong affinity for more oxygen, which property it carries with it when administered as a medicine.

By its great power as a deoxidizer it retards cellular combustion and permits vital processes to proceed regularly. Dr. Churchill, of Paris, called attention to these salts in 1856, and claimed that they were of infinite advantage in the treatment of consumption, even long before Mr. Gardner had discovered his valuable method of combining them.

These new preparations at once assumed a leading position in modern pharmacy, and stand to-day unrivaled among its products for effectiveness, stability, and elegance of form.

They number more than twenty different combinations so that it is practically out of the question that a practitioner should not find in one or the other the elements of tissue building which he seeks.

For more than a year past I have followed with interest and care, the administration of Gardner's preparations and with a single exception, to be hereafter noted, the results have been good and their administration effective. So much so indeed, that I

have arrived at the conclusion that no better form of nerve food or artificial reconstructive need be sought. It is my purpose to close this paper with a series of pictures of cases whose only medical treatment was by Gardner's syrups.

CASE I.—Miss D., aged 52. In April of 1891, had an attack of grippe which lasted about three weeks, again in October of the same year, had another slight attack. In June of 1892, was taken with rheumatism in the knees, which steadily increased. Appetite good, slept well, no pain in back, but considerable headache over brows. With electrical treatments was ordered Gardner's Hypophosphite of Soda which was continued for about two months with steady improvement. At the end of that time the soda was changed for Hypophosphite of Iron which was kept up until her dismissal, a comparatively well woman, in April of 1893.

CASE II.—Mr. H., aged 34. About a year ago, upon examination of inner right thigh a slight tumor was found, about the size of a hen's egg, movable under the skin, with occasional acute pain following nerves down to and around the knee, starting from the groin. The growth increased up to last March, when it had attained the size of a child's head, and was removed by Dr. L. P. Pilcher, of Brooklyn, who pronounced it a semi-malignant tumor, containing a certain amount of fluid. Since the operation he has been gradually losing tone. Suffers some from pain in line of incision, with stiffness of muscles increasing with exercise. In May last was ordered Gardner's syrup of Hypophosphites of Lime and Soda, taking for one month syrup of Hydriodic Acid. In June the enlargement in line of scars absent, and the general conditions were much improved. Changed the compound to Hypophosphite of Iron. The progress has been rapid, the stiffness is giving way, and strength is increasing.

CASE III. Mrs. M., has never been strong since marriage and within a year has broken down with mental overstrain. Has great weakness and general nervous debility. Appetite poor, sleeps fairly, hands and feet cold, pulse fair. Has been since May taking syrup Hypophosphites of Iron and Quinine with excellent results. Later a uterine trouble come up for which a solution of white oak bark and glycerine is being used as a tampon while the syrup of Hypophosphites of Iron and Quinine is still being taken as a tonic.

CASE IV. Master L., aged 11. A little over two years ago, while at breakfast, had a convulsion which lasted some ten minutes, followed by sleep, and after an hour or two, vomiting of undigested food. No aura epileptica of any kind. Pallid face and pale lips covered with hot scabs. Epilepsy, minor form of indigestion. A careful diet list was ordered, laxative antiseptic pills and the bromides. After about one month of this treatment Gardner's syrup of Hypophosphite of Iron with syrup of figs was given. The improvement has been rapid, incurring but two or three convulsions since he began treatment, and these being caused by not carefully following the diet given.

CASE V. Miss R., had some three months ago caught a severe cold and had a sharp attack of grippe. Upon presenting her case to her physician he prescribed Gardner's compound of iron and quinine, a tablespoonful to be taken four times a day. After taking twelve ounces of the syrup, she returned for more, saying, "Doctor that medicine seemed to be the right thing. I have not eaten as much at my meals for a year and I feel like a new woman," which she certainly looked, with her bright eyes and glowing cheeks.

Another bottle was given her and after she had taken four she was entirely free from all effects of the health-destroyer grippe.

CASE VI. Only one case do I call to mind where the Hypophosphites have not done good.

Mrs. I., a pretty little woman of twenty, came from New Hampshire, in April of 1893, for medical care. Two months before had neuralgia in the head and was under the care of a charlatan, steadily growing dizzy and deaf.

After three days of sharp electrical work she could hear very faintly a watch tick at a distance of two or three inches from her ear. At the end of a week she could hear it at a few paces away, the dizziness had gone but she had very little strength, no

appetite and was constipated. Gardner's syrup of manganese was ordered but the dizziness and deafness returned and she began to feel great nausea. After two or three days she could keep no food whatever upon her stomach and a diarrhea set in.

In place of the manganese, Hypophosphite of Iron was given with scarcely better results.

Again the syrup was changed, this time to iron and quinine; the results were almost magical when combined with electrical treatment, and by the first of June she left the city a happy, well woman.

I hear from her occasionally and she always speaks of "Gardner's syrup" and "electricity" as being the cause of her restoration to health.

CASE VIII. Master Willie L., age 15, from his boyhood had been lame, owing to undeveloped flexor of thigh muscle.

He had been under electrical and other treatments by different physicians ever since. Last winter he came to me for electrical treatment and in combination with the sittings has taken the syrup of Hypophosphites with good results, gaining strength and weight rapidly.

Enough has been said, I think, to show some of the good the syrups of Hypophosphites, manufactured by our friend Gardner, is doing.

THE VALUE OF THE ALKALINE HYPOPHOSPHITES IN BUILDING UP THE HEALTH OF DELICATE AND WEAKLY CHILDREN.

BY Q. CINCINNATUS SMITH, M. D., AUSTIN, TEX.

(Reprint from *Texas Courier and Record of Medicine*, Dec. 1893.)

That this class of patients should receive the benefit of the best food and hygiene obtainable goes without saying. However, it often occurs, in the care and treatment of delicate and weakly children, we feel impelled to invoke the aid of drug-remedies.

We have been often called to prescribe for delicate and feeble children, many of whom do not assimilate food in sufficient quantity to grow strong and vigorous, as they naturally should. In many of this class of cases, (after relieving urgent symptoms, if such be present,) we have learned of no better remedies than the Hypophosphites of Lime and Soda. These we prescribe, one to three grains, in the form of well made syrup,* three times a day, at meal time. We never give but one of the Hypophosphites—for any medicinal purpose—at one time.

The mixing of the Hypophosphites is a grave therapeutical error committed by many well educated physicians. We often alternate the use of the Hypophosphites of Lime and Soda in this class of cases; give the soda salt two weeks, then withhold the remedy one week, then give the lime salt two weeks.

And if the patient be strumous or syphilitic; as such patients often are, the syrup of Hydriodic Acid should be given—half to one small teaspoonful, three times a day, half hour before meals, during the intermediate week—when the Hypophosphites are not being administered.

Should an acute attack supervene during the chronic treatment of this class of cases, the use of the Hypophosphites should be discontinued until convalescence is established, then the Hypophosphites resumed and continued until the patient is well and strong; which will require, in many cases, diligent use of the remedies for several months.

*Dr. Smith has used Gardner's syrups of Hypophosphites, exclusively for many years. R. W. G.

These remedies are all very pleasant to take, when given in the form of well-made syrup, and will, in many cases of chronically delicate, weakly children, produce beneficial results that cannot be so surely and pleasantly secured by any other class of drug-remedies. These remedies, when given in proper doses, do not perturbate the system in the least, and can be taken for long periods of time without becoming distasteful to even the most delicate patients.

PULMONARY TUBERCULOSIS.

Dr. J. T. Wrightson, Newark, N. J., writes giving the following interesting particulars of an undoubted case of inherited pulmonary tuberculosis.

"Father died (tuberculosis) at 35 years. Four children died before 17 years of age. Last child came to me at 16 years of age. Had all the symptoms of phthisis, none missing. Her stomach in irritable condition. Could not take the syrups. Prescribed the elixir Hypophosphite Lime, Soda, Iron and Potassium (Gardner's) which was borne readily by the stomach, and patient immediately commenced to improve. She eventually recovered completely, married, moved to Connecticut, and now has a family."

Dr. A. Ostertag, St. Louis, Mo., February 27, 1889, writes: "I must say that I have been very much pleased at the change it (Gardner's Syrup Hypophosphite of Lime) has worked in the physical signs in the lung in a case of chronic tuberculosis, following a severe chronic diarrhoea of four years' duration, and in his cough, which harassed him day and night and was draining the life out of him."

THE TREATMENT OF PULMONARY TUBERCULOSIS.

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On an occasion of this kind, consideration of such a question as the therapeutics of pulmonary tuberculosis must necessarily be brief.

The great amount of experimentation and discussion devoted to this subject during the past two years, renders a thorough review of the subject at this time impossible.

The discovery of the tubercle bacillus as a specific element in the etiology of this disease, taken in connection with the inoculation experiments of Pasteur with the cholera germ; Charrin with the bacillus pyocyaneus; Roux and Yersin with the Loëffler bacillus of diphtheria; Brieger and Fraenkel's experiments with the same bacillus; Hankins and Sidney Martin with the toxins of anthrax cultures, seemed to furnish good ground for the enthusiasm which greeted Koch's announcement of his antidote to the tubercle bacillus. The practical failure of tuberculin so far, as a specific remedy for tuberculosis has confirmed the doubts of those whose actual clinical experience in the management of phthisis caused them to hesitate before accepting the claims made for this agent.

It is claimed by some that the reaction against tuberculin has gone too far, and Klebs, Hunter, Kinnicut, Beach, Dennison, Thorner and many others have reported results with tuberculin or some modification of it which are more or less favorable.

Nevertheless it does not appear that their results are any better than can be obtained by other methods of treatment, and until such is the case, no special claim can be substantiated for this remedy. It is, however, yet too early to pass judgment in this matter.

The introduction into the system of substances which inhibit chemically the life of the specific bacillus of the disease, and antagonize the effect of the toxins resulting from the life activity of microorganisms, is theoretically an inviting method of therapeutics. The observations of Armand Ruffier relative to the action of lymphocytes and microphages, bring up the question as to what extent such chemical treatment may be carried without interfering with the natural therapeutic effect exhibited by the biological processes of these cells. Specific effects from agents of this class introduced into the system, must be obtained in one of these ways; by destruction of the bacillus by antagonizing the evil effects of the bacillus, or by stimulating cell activity, and possibly by increasing the germicidal power of the bodily fluids to convey immunity against gross pathological changes in the lungs, or by such cell stimulation inducing connective tissue changes in the pulmonary tissue. In the light of the experiments of Roemer and Büchner, which open the question as to whether protein extractives derived from other sources that the tubercle bacillus, may not be able to produce irritation, inflammation, and necrosis; also the experiments of Prudden to the effect that an element of the protoplasm of dead bacilli possesses great cell stimulating power, the resulting lesions not having the active tendency to necrosis exhibited by the tuberculous lesions, together with the opinion of most observers that the practical failure of tuberculin is due to its tendency to produce tissue necrosis, we are still justified in hoping that further experiment will eliminate the peculiar destructive element from this agent, and will leave us a substance capable of producing definite therapeutic results. It seems most reasonable to expect these results through the induction of connective tissue changes through cell stimulation, at least in those instances where gross tissue changes have resulted from the action of the bacilli.

Klebs insists on the fact that tuberculocidin does not induce any inflammatory or necrotic process, and acts only through its germicidal qualities.

When any considerable tissue change has taken place in the lung, the term cure can only be used in a relative sense, the lung can never return to its former condition, and the respite from further destruction depends on the extent to which nature will limit the process by connective tissue organization. These cirrhotic processes in tuberculous lungs, must be regarded as nature's efforts to limit the disease.

Councilman's view, that because bacilli are found in the inflammatory tissue surrounding tuberculous masses, this tissue must therefore be part of the tuberculous process, does not seem to be well taken.

There is less tendency to necrosis in tubercular nodules where fibroid development has been marked, providing the blood supply has not been cut off, as shown by the better vitality in these nodules where Cornil and Ranvier were able to demonstrate blood vessels.

The fact that lungs have undergone fibroid development from other than tuberculous causes, are especially liable, in some instances, to secondary tubercular infection, does not militate against this view of the protective nature of these indurative processes. Cardiac hypertrophy is nature's remedy for insufficient force, and yet this very hypertrophy entails of itself in time, insufficient nutrition and degeneration; so in the lungs sclerotic processes compromise the circulation, nutrition, oxidation and elimination, consequently the resistance of a lung under such conditions must always be such as to invite the invasion of the tubercle bacillus.

The impossibility of the limitation of tuberculous processes without the development of connective tissue changes, directs our therapeutics in the line of combating the tendency to necrosis in such processes until such changes can be developed, and all methods of treatment are found directly beneficial in so far as they favor such develop-

ment. In consideration of the general acceptance of the tubercle bacillus as the specific cause of tuberculosis, also that the majority of medical men at present agree with Koch and Virchow, that it is not the disease which is inherited, but a condition of vulnerability of the tissues, preventative medicine becomes of the greatest importance.

It is surprising what an apathetic state exists not only among the general public, but among medical men also, in regard to this feature of the subject. On the part of the public it is the result of ignorance largely, though the average citizen considers it as a violent infringement on his personal rights, any attempt to regulate his great American prerogative of expectorating when and where he chooses.

If the course adopted by the anti-tuberculous league of France, or some modification of it as suggested by the editor of the *Universal Medical Journal*, be adopted in this country, and the excellent set of rules and instructions adopted by this society be made public property, much good might result therefrom.

If the claims of Grancher and Martin should prove true, *i. e.*, that it is possible by inoculation to establish a prolonged resistance to fatal forms of tuberculosis, and also to produce an immunity from infection, of a greater or less duration, it might be possible to attain some definite results in this department of medicine.

Next in order I would place the climatic treatment of tuberculosis. The results obtained by the use of remedies alone, in a climate like this, cannot compare with the results obtained by the judicious use of climatic and medicinal means combined. The many difficulties in the way of the practical application of climatic treatment need not be dwelt upon. As far as the medical adviser is concerned, it appears the chief fault lies in a want of proper knowledge of the geographical and meteorological conditions of various localities, and the specific requirements of the individual case. In regard to the former it is to be hoped that the work of the American Climatological Association may result in more general and definite knowledge. In regard to the latter, and the special adaptation of certain localities, the contributions to the literature of this part of the subject by resident practitioners, while recognizing the special features of their particular locality, adapting it to the special forms of the disease, the general features of the region are so enlarged upon that the locality in question would seem to be the Mecca of all tubercular pilgrims.

The general features of climate which are beneficial are equable temperature, dryness, elevation, and in some instances warmth.

In some localities an ozonized atmosphere is credited with the good effects. The recent observations of Ohlmüller, of Berlin, go to prove that ozone has a powerful destructive action on various bacilli, in an inverse ratio to the amount of organic matter present, and the dryness of the bacteria and ozone.

Schoenheim's opinion, that ozone in the atmosphere is a powerful disinfecting agent, is supported by the observations of Wolffhügel and Fox. Dr. Henry S. Norris reported in the *New York Medical Journal* for November 5, 1892, a series of cases treated by the administration of ozone with beneficial results. It is probable that the good effects of climate in some localities in the lower altitudes is due largely to ozone. The general effect of climatic treatment is to stimulate oxygenation, oxidization and elimination, and the stimulant effects of ozone on these functions cannot but be beneficial.

The writings of Williams, Copeland, Taylor, Burney Yeo, Huggard, Fisk Anderson, and others give a fairly unanimous view of the effect of climate, and the class of cases likely to be benefited. The chief discrepancy one finds in the papers on this subject is the varying opinions regarding altitude in hemorrhagic cases. There is no doubt that with proper sanatoria with modern hospital regulations, located in the various health regions, and with the cases properly selected according to the nature of the location, that much better results should be obtained than by the haphazard way of allowing patients to go to these regions and take care of themselves.

Nicaise, Herman Weber, Leyden, Detweiler, Kretschmar and others advocate the hospital treatment of tuberculosis in special institutions. The promiscuous association

of cases which are in an infectious condition, and those which are not, at health resorts, is to be discontinued.

The tendency of the present is to avoid warm climates, especially those of moderate moisture. Williams has shown that some cases of catarrhal nature do the best in such a climate.

In indicating the altitude for a given case the following factors must be kept in mind: Age of patient, stage of disease, rapidity of development, presence of pyrexia, amount of tissue involved, condition of general bodily functions, condition of heart circulation, course of infection if it can be determined.

The available lung space, the absence of emphysema, and the condition of the heart are important factors in estimating the effect of a dry rarefied atmosphere.

Cases showing rapid development, considerable involvement of tissue, pyrexia; cavities showing tendency to rapid necrosis of lung tissue, absence of connective tissue development, tendency to hemorrhage after disease has existed six months, emphysema, bronchiectasis, dyspnoea and cardiac weakness are unsuitable for an elevation of over 1500 feet.

Cases of fibroid phthisis with much shrinking of the lung are not suited for high altitudes, even though pyrexia be absent, as these cases eventually suffer from cardiac degeneration and failure. Eight per cent. of markedly tuberculous patients discharged from Brehmer's institute at Goerbersdorf remained relatively cured after fifteen years.

The only remedy which has held its own in the medicinal treatment of tuberculosis, is creosote; this medicament after falling into disuse for a number of years, again revived, chiefly owing to the abiding faith and advocacy of Summerbrodt of Breslau, who asserts its specific influence by resisting the development of bacilli. Guttman concludes that if the blood could be made to contain one four-thousandth part of its quantity of creosote, bacilli would cease to develop. He calculates that this would require over twenty grains, which he thinks impossible because we cannot determine the necessary quantity for administration. Summerbrodt however, believes it possible to administer the necessary quantity. Wm. H. Flint claims the best results are obtained by pushing the remedy to the point of toleration by mouth, rectum and by inhalation.

Tortenson exhibits three to four grammes daily of the drug, by intramuscular injection of guaiacol in sterilized olive oil, and by rectal injection of creosote.

Cornet, from experiments, concludes that the favorable effect of creosote results from its improving the appetite and diminishing bronchial secretions. This view is also taken by some clinicians. Recent experiments go to prove that creosote in the blood combines with certain albuminoids forming combinations which are without any particular germicidal influence. Experiments on animals have not borne out the theory of Bouchard and others, that creosote induced connective tissue growth. Personally, I entirely agree with the opinion that any such influence is exerted only through its ability to stimulate nutrition. I have never been able to convince myself that directly it affected the process in the lung in any way. My own experience with creosote has been indifferent. The appetite generally improves, and some weight may be gained, with general improvement in all the symptoms, but it does not appear to me to have any effect on the tubercular process in the lung. I have used it generally in capsule or in emulsion with hydroleine. The substitution of guaiacol or some of the other substitutes for creosote is much pleasanter for the patient and appears to be about as efficacious.

It is possible that in this country we have been administering too little creosote to obtain as good results as are claimed by continental observers, but the gluteal injection of from six to eight grammes of a mixture in the morning, and the rectal injection of a pint or more at night, is a form of treatment hardly adapted to the disposition of the average American, especially when this must be continued for two years or more.

The use of intratracheal injections and inhalations while they may relieve some

symptoms as curative means, will probably, in time, be placed in the same category of failures as the more unscientific hot and cold air treatments of Worms and Krull.

The cantharidin treatment of Liebreich has not been largely accepted; theoretically it is a reasonable method, and experiments have not been altogether without results. It seems very doubtful, however, if practical results can be obtained by this method, though when we consider the practical immunity from infection, afforded by the greater amount of serum in the lungs from insufficiency of the mitral valves, the theory of Liebreich does not seem visionary, taken in connection with the experimental proof already afforded of the germicidal properties of the bodily fluids.

The treatment by dogs' serum, and local injection of chloride of zinc, have so far failed of any practical results, and need not be specially commented upon.

The Gibb's-Shurley treatment has died a natural death, if indeed, it was ever born, the practical inutility of this method of treatment impressed itself early upon me, and experimentation with it has only served to confirm my first impression. In my own practice, both public and private, I have for a number of years past treated a number of cases with Hypophosphites in the form of a syrup of whichever salt was indicated; "*I prefer Gardner's syrup as being the most stable on the market.*" This must not be confounded with the combined Hypophosphites. The latter preparation I used for several years in a large number of cases and became firmly convinced of the truth of Churchill's teaching, that the compound syrup of Hypophosphites is distinctly injurious to phthisical patients.

The Hypophosphite of Soda is generally the most useful, and is given in aperient cases where there is not much expectoration.

The quinia salt is used temporarily when the temperature is over 100° Fahrenheit, and the lime salt where there is too free expectoration, six or seven grains daily being the maximum dose. I believe I have had fully as good results from this method, as by any other, if not better.

In advanced cases I have found no mixture so efficient in quieting the cough and loosening the sticky mucus as one-eighth of a grain of morphine with ten drops of dilute hydrobromic acid given in syrup of tolu. For troublesome night sweats atropine and camphoric acid are the most useful. The latter is free from the disagreeable effects of the former, and may be given in capsules of five grains each, three of these at 6 in the evening and three at 9, and increased if necessary; the effect may last for two or three nights.

In closing I wish to deplore the fact that there is in this city, so bountifully supplied with charitable institutions for the supply of medical and surgical relief to the needy, not one devoted to the care of the most fatal malady of our time. With the general recognition of the infectiousness of tuberculosis, hospitals which have always admitted such cases are becoming very reluctant to do so, and the indigent sufferer from tuberculosis literally has nowhere to lay his head. A special institution for the treatment of such cases is a crying necessity, and it is hoped that Chicago will not much longer remain behind other large cities in this respect."

Richtis.—A. Springer, M. D., physician in charge, State Home, for sick and needy children, Lewiston, Me., writes: "We have found the syrup of Hypophosphite of Lime, of great value in richtis and similar diseases. A number of children, unable to walk, have been cured by that treatment. Several cases outside the 'Home' are taking it with benefit."

"The Hypophosphites have been largely used and highly extolled by Dr. Churchill in the treatment of pulmonary consumption, especially the alkaline Hypophosphites, which should be perfectly pure, like those of R. W. Gardner, of New York."

"*Materia Medica, Pharmacology and Therapeutics.*" Shoemaker, vol. 2, page 812, 1891.

Phthisis.—A. U. Evarts, M. D., special examiner surgeons pensions, La Porte City, Iowa, July 17, 1886, writes: "Our druggists have ordered your syrup, and I am satisfied that *through it alone* I have saved one consumptive's life, and probably

two. The positive case was the worst one,—in the third stage of phthisis. Patient confined to bed—fever, cough, night sweats, and hemorrhage that presaged immediate dissolution of patient. Right lung cavernous, and almost wholly hepatized—left lung partially implicated. After a thorough examination, I gave the patient about three weeks to live. Put patient permanently upon Gardner's syrup Calcis Hypophos. Improved slowly but surely for a year and a half; occasionally patient has return of bad symptoms. On an average of once in three months for two years, this case, a woman, has had a formation and rupture of pelvic tumor.

Have had a number of other cases, first and second stages, and have been obliged to prescribe different makes of the syrups, and have found disappointment resulting from their use. To be brief, I will say I look for mathematical precision when I use your syrups of lime or soda. I get better results in treatment since following Dr. Churchill's mode. Hereafter I will record my cases for the benefit of the profession. These general facts will suffice to awaken the interest of the true physician in the treatment of phthisis."

LIST OF GARDNER'S Special Pharmaceutical Preparations.

(Put up in 16 fl. oz., 8 fl. oz., and 4 fl. oz. bottles.)

Gardner's Syrup of Hydriodic Acid.

6.66 grains Iodine in one fluid ounce.

HYPOPHOSPHITE PREPARATIONS.

All of the following preparations are put up in 16 fl. oz., and 8 fl. oz. bottles.
(No 4 oz. size.)

Gardner's Syrup of Hypophosphite of Lime.

20 grains in one fluid ounce.

Gardner's Syrup of Hypophosphite of Soda.

20 grains in one fluid ounce.

Gardner's Syrup of Hypophosphite of Iron.

4 grains in one fluid ounce.

Gardner's Syrup of Hypophosphite of Potassium.

16 grains in one fluid ounce.

Gardner's Syrup of Hypophosphite of Manganese.

4 grains in one fluid ounce.

Gardner's Syrup of Hypophosphites of Lime and Soda.

20 grains in one fluid ounce.

Gardner's Syrup of Hypophosphites of Iron and Quinia.

4 grains Iron and 1 grain Quinia in one fluid ounce.

Gardner's Syrup of Hypophosphites of Lime, Soda and Potassium.

17 grains in one fluid ounce.

Gardner's Syrup of Hypophosphites of Lime, Soda and Iron.

17 grains in one fluid ounce.

Gardner's Syrup of Hypophosphites of Lime, Soda, Iron and Potassium

17 grains in one fluid ounce.

Gardner's Elixir of Hypophosphite of Lime.

20 grains in one fluid ounce.

Gardner's Elixir of Hypophosphite of Soda.

20 grains in one fluid ounce.

Gardner's Elixir of Hypophosphite of Iron.

4 grains in one fluid ounce.

Gardner's Elixir of Hypophosphite of Potassium.

16 grains in one fluid ounce.

Gardner's Elixir of Hypophosphite of Quinia.

8 grains in one fluid ounce.

Gardner's Elixir of Hypophosphites of Lime and Soda.

20 grains in one fluid ounce.

Gardner's Elixir of Hypophosphites of Lime, Soda and Iron.

17 grains in one fluid ounce.

Gardner's Elixir of Hypophosphites of Lime, Soda and Potassium.

17 grains in one fluid ounce.

Gardner's Elixir of Hypophosphites of Lime, Soda, Iron and Potassium

17 grains in one fluid ounce.

NOTE.—The undersigned wishes to state that the combinations of different Hypophosphites quoted in the above list have been prepared at the request of physicians to meet an inevitable demand. They are *distinctly discountenanced and never employed by Churchill* in phthisis. Some of them have been used with much advantage in other conditions. But the multiplication of remedies in combination, where many of them are not indicated or are therapeutically antagonistic, ought certainly to be avoided.

R. W. GARDNER.

Prepared by **ROBERT W. GARDNER,**

Pharmaceutical Chemist, New York.

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