deposit with its attendant results, and so permit healthy action to prevail, yet it is only a question of the substance used, not of the principle involved. Why have the pine-forests of Brittany proved so beneficial to many consumptive patients? or why has sulphur-inhalation arrested the disease in many others? Are we to disbelieve these things, and assert that the beneficial results were due to other causes? I am not inclined to do so, but firmly believe that the continuous inhalation of an air moderately impregnated with some perhaps yet unknown vegetable or mineral product will ultimately prove the cure of phthisis.

But where are we to find the specific mineral or vegetable which is to do this? We can but grope on, testing and trying various ones. We may not be far from the needed substance, if we follow on the lines indicated by the good results which every now and then follow the inhaling of creasote and other preparations from resinous exudations and of sulphur.

These few thoughts on a subject of pressing importance—for there can be little doubt that phthisis is on the increase—are written for the sake of directing attention to the endeavours that are being made, both here and on the Continent, to bring this formidable disease under a certain line of treatment—one, in fact, which has for its starting-point the assumption that phthisis pulmonalis is the product of the action of a specific vegetable sporule, and that it can only be successfully encountered by bringing it into direct antagonism with its own germicide.

In conclusion, I may say, as several inquiries have been made of me, that the paper by Dr. Williams which has given rise to the above remarks is published by Marples and Co., Lord Street, Liverpool; and the respirator he uses is made by Wood, instrument-maker, Church Street, Liverpool.

OBSERVATIONS ON THE USE OF HYPOPHOSPHITES IN THE TREATMENT OF PHTHISIS PULMONALIS.*

By JOHN C. THOROWGOOD, M.D., F.R.C.P.,

Physician to Victoria Park Hospital for Diseases of the Chest, Lecturer on Materia Medica at the Middlesex Hospital.

I WOULD preface the few remarks which I am about to make on the use of the above named remedies in the treatment of pulmonary consumption, by stating that I have no intention of putting them forward as specifics for the cure of phthisis. I find that an experience of seventeen years among the patients of a hospital specially devoted to the treatment of diseases of the chest gives very little encouragement to a belief in a specific cure for consumption, though I willingly admit that one does learn something of the special sphere and power of action of certain drugs as agents of more or less value in the treatment of pulmonary disease in its various forms and stages. What I claim for certain of the hypophosphite salts is, that they are worthy of a place high in the list of our medicines for consumption. My own experience, dating from 1863, would lead me now to say that I know of no remedies so generally applicable and beneficial in the treatment of phthisis as are the hypophosphites.

I had in my mind the idea that true tuberculosis, in the form of grey miliary tubercle, was a disease in which the nervous system was much concerned. My reason for this opinion was that the disease is apt to come on in an acute form in cases where there has been great nervous strain or exhaustion.

Two of the most hopeless and rapidly fatal cases of this acute tuberculosis that I have met with came on in the cases of two young ladies, not relatives, each of whom had been working very hard for a competitive examination, and so had undergone much exhaustion of nerve-force.

The affinity, too, of miliary tubercle for affecting the nervous system is much; for, in many cases, miliary tuberculosis manifests itself only in the form of a basilar meningitis. Considering these points, I thought phosphorus and hypophosphites might be valuable in restoring the exhausted nerve-force.

Against these ideas of mine as to the nervous origin of miliary tubercle, we have to place the observations of Buhl and others, who regard miliary tuberculosis as an infective disease, produced by auto-inoculation from caseous matter in the body. I do not, however, give my implicit adhesion to this statement, if it be held to mean that we never get miliary tuberculosis unless some caseous deposit, or other infecting centre, be present somewhere in the body. In proof of this statement, I would take the case of one of the young ladies just referred to. She fell ill May 14th, and died on June 1st; and a careful *post mortem* examination by Dr. Peacock showed both lungs airless and filled with small

miliary tubercles, none of which had undergone any softening process. We do not hear of any caseation or softening, while the history tells of much nervous strain and exhaustion as the cause of the disease. To go further into the nervous origin of miliary tuberculosis will lead me away from the more practical object of my paper; I will therefore now endeavour to show in what form of phthisis I have found hypophosphites useful medicines.

I will give, first, examples of the effect of hypophosphite salts in cases of strumous or scrofulous pneumonia. It is well known how, in a scrofulous subject, a pneumonia is very protracted. The infiltration of lung subsides very slowly, or it may remain stationary, and undergo regressive metamorphosis of a cheesy character. A scrofulous catarrh persists, with abundant cell-formation, and a cellular infiltration penetrates deeply into the submucous tissue of the lung; thus the wall of the air-cell is destroyed, and a true phthisis pulmonalis, or lung-consumption, is established. Secondary to this, we may have miliary tubercle, the seat of which formation is the subepithelial connective tissue, and also the lymphatics of the lung.

Illustrations of this kind of lung-disease are very common among badly fed children who come to the hospitals, and also the same kind of disorder is by no means unknown among the better classes. A child passes through an attack of measles, and gets a cough and pulmonary congestion that do not pass away. Cod-liver oil, iron, and sea-air may, after a while, effect a cure; but I have never seen such good results from the two first named remedies as I have seen follow the administration of hypophosphite of soda and hypophosphite of lime.

This is the sort of case to illustrate what I have just said. Miss Eva H. was seen by me April 1st, 1874. She was then convalescent from an attack of measles, but an obstinate cough remained, with some feverishness. There was dulness with tubular breathing at the upper part of the left lung, and the note in my book says, "pneumonic deposit at left apex." Nitric acid was taken for ten days, and then, as the physical condition of the lung was in no way changed, two grains of hypophosphite of lime with glycerine and water were given, and the child went to Eastbourne.

June 5th. I found her better, and the pulmonary condition on the left side improved, but she was still feverish and still had a cough, while I found some impaired resonance at the base of the right lung, with a slight crepitant *râle*. Hypophosphite of soda was given in two-grain doses, and in a couple of months the signs at the right base were gone, and the dulness at the upper left chest had diminished notably. This little girl went on well till she got scarlatina in February 1880, and on the 21st of that month I was asked to see her with Mr. Kingston Barton. When I saw her, the rash of the fever was subsiding, but she had a temperature of 104°, pulse 14, respirations 48. Much crepitation was now heard over the apex of the left lung, as if old mischief had been set going again by the fever. She had slight albuminuria, and casts of blood-corpuscles were seen in the urinary sediment. The only remedy that the stomach would retain was three or four drops of nuxempe at bed-time. Quinine, digitalis, and belladonna, were tried and failed. On July 28th we began two grains of hypophosphite of lime in glycerine and water, and it kept down well. On Tuesday, March 2nd, after being at the point of death, with a temperature of 104°, for about four days, a crisis took place. Temperature fell to 101°, pulse 115; there was still much crepitation in the upper left lung; respiration on the right side was loud and puerile. Hypophosphite of lime was continued till the end of March and then the cough had ceased. The left upper chest was somewhat fallen in, the breath-sound was tubular, almost free from crepitant sounds, and the patient has done well ever since. A marked pulsation of the left auricle could be seen in the chest, due to some contraction of upper left lung.

A favourable result, therefore, in this case was associated with the continuous administration of two grains of hypophosphite of lime, after the unmistakable failure of other approved remedies.

The case of Timothy S., in Victoria Park Hospital, is another one to illustrate the good effect of hypophosphite of lime. The patient was ten years old, and his illness began with a troublesome cough. On April 23rd, 1874, he had dulness at the left base, with crepitant *râles*. He took daily three grains of hypophosphite of lime, and by July 30th had gained flesh and lost all his morbid pulmonary sounds.

The case of William P., one of the first I treated with hypophosphite of lime, impressed me much. William P. came to Victoria Park Hospital December 14th, 1863, with severe cough, much expectoration, much loss of flesh, and bad diarrhoea. He had been ill three years, and had taken much cod-liver oil. I ordered him five grains of hypophosphite of lime, one fluid ounce of decoction of cinchona, and two drachms of cod-liver oil three times daily.

* Read before the North London District of the Metropolitan Counties Branch.

January 11th, 1864. He felt much better. Pulse 96. Expectoration was very much less. Diarrhoea had ceased. Cavertous sounds and large crepitation were heard at the upper part of the left lung. He was ordered fifteen minims of tincture of iron three times daily. In a week he returned worse in every respect; the diarrhoea was as bad as ever. The hypophosphite of lime was resumed, and on it he again improved very markedly.

The case of Minnie S., who has just left the hospital, deserves a word of notice. This girl comes of a consumptive family, and has always had some cough. After an attack of measles, she was laid up with severe cough and congestion of left lung. Fourteen days afterwards, on November 13th, 1880, she came into Victoria Park Hospital with much cough and expectoration, and a temperature of 102°. The left lung was dull, and full of crepitant *râles* in its upper part. She took regularly three grains of the hypophosphite of lime for six weeks, and lately she has been taking some of Burrough's iron and beef wine. She has gained about ten pounds in weight, and, though the dulness at the upper left lung is not gone, yet the crepitant *râles* are scanty, her cough causes her hardly any trouble, her pulse is quiet, and she can run about like a child in perfect health.

I should have liked to be able to give you a few more cases to show how well the hypophosphites answer in curing caseous and scrofulous pneumonia of the apex of the left lung. Croupous ordinary pneumonia of the base I believe very rarely to lead to phthisis, but catarrhal pneumonia of the apex is very apt indeed, especially in young scrofulous persons, to lead to destruction of lung-substance; and it is in these cases, where cell-products accumulate in the alveoli and bronchioles that both phosphorus and hypophosphites are unsurpassed in curative action by any remedy with which I am, as yet, acquainted. Nor am I singular in this belief; my friend and colleague at Victoria Park Hospital, Dr. Eustace Smith, has said to me, and has said also in his *Clinical Studies on the Diseases of Children*, pp. 178, 289, that, when softening in a deposit has begun, the effect of hypophosphite of lime is often very remarkable; and again, page 289, speaking of pneumonic phthisis, Dr. Smith says "The effect of the hypophosphites seems at times almost magical; but in true grey tuberculosis they, in common with quinine, digitalis, and other remedies, are of small avail."

Thus I have briefly endeavoured to show the indications for the employment of the hypophosphites in phthisis pulmonalis. Most useful medicines I have found them; never have I seen any injurious effect follow their administration, and all I would say in conclusion to anyone who is disposed to try these salts is—Examine well the patient and see if he have any hepatic or renal disease complicating his lung-affection, and then test your hypophosphite to see if it ignites readily when heated. Lastly, give the salt in as simple a form as possible. A little bicarbonate of soda may be added to the soda salt, and some liquor calcis saccharatus to the lime salt; and then let simple water, or syrup and water, form the vehicle for administration.

PHTHISIS: ON THE THEORY OF INFECTION, AND ITS INFLUENCE UPON TREATMENT.

By W. R. THOMAS, M.D., M.R.C.P.,

Physician to the Sheffield General Hospital, Lecturer on Medicine, Sheffield Medical School.

I so frequently meet with patients suffering from phthisis in whom no hereditary tendency whatever can be traced, but who have lived with another or others who have suffered from the same complaint, that I cannot help thinking that the disease must be infective; more especially as, in many, what we consider to be the predisposing and exciting causes have not been present to any great extent.

Now, if phthisis be infectious, and if we can satisfy ourselves by careful observation that it is, that knowledge alone will enable us, by recommending certain precautions to be taken, to save the lives of thousands who might in the future, being ignorant of the fact, expose themselves to the infection, and ultimately die of the complaint.

The following are examples of cases to which I have before referred.

A. A married woman, aged 30, has extensive deposit in the upper part of her left lung. Her husband died, eight months ago, of phthisis, and she has never been well since.

B. A phthisical young man, aged 24, slept with another young man for two years, who afterwards died of phthisis. He has never felt well since; he gave up living with his friend two years ago.

C. A young man, about 30, is decidedly consumptive; his wife died about eight months ago of the same complaint.

D. A widow, aged 26, has a cavity in her right lung. Her husband died of phthisis twelve months ago, and her child of *tabes mesenterica* fifteen months ago.

In all these cases, the family history was favourable. Of course, such patients are often exposed to the ordinary causes of phthisis. Watching, worry, and want, tend to produce it; but cases of death from phthisis occur so often among those who have attended upon phthisical patients, that I cannot help thinking that there must be some cause for the frequency which we do not now appreciate, and that probably many of the cases now deemed to be hereditary, are owing to infection.

For years, we have been in the habit of reading, and now read, of dogs who, after licking the phlegm expectorated by a phthisical master or mistress, have died of the same complaint; proving that the act of swallowing, or inhaling, or both, reproduced the disease in the animal.

Dr. Tappeiner mixed half a gramme of pus from a tubercular lung with one hundred grammes of water, and made dogs inhale the atomised mixture for a quarter of an hour daily for ten days; this produced cough, loss of weight, etc. The animals were then killed. Those killed before the nineteenth day presented no tubercles whatever. Those killed after the twenty-third day presented tubercular nodules, proved to be such by microscopical examination of the lungs and spleen. Other dogs were treated in the same way with pus from scrofulous abscesses and bronchitis, but no tubercular mischief whatever was produced by such pus.

Some maintain that, in phthisis, the morbid process begins with proliferation of the connective tissue elements of the outer walls of blood-vessels; and that this action gradually involves the surrounding cellular tissues. Dr. Burdon Sanderson maintains that the disease begins with proliferation of cells of adenoid tissue, which is abundant everywhere, and often connected with the walls of blood-vessels. Dr. Klein says that the first changes take place in the alveoli and interalveolar septæ; that the epithelial cells become enlarged and detached; that they then proliferate; and that, either by their coalescence, or by the enlargement of one, a multinuclear cell is formed; and that degenerative changes take place afterwards.

Probably all these theories are correct; and it may be that certain irritating particles, when they come into contact with the delicate lining membrane of the tubes and alveoli, produce proliferation of cellular tissue corpuscles, of cells of lymphatics, and of epithelial cells as well.

Now, if it be true that phthisis is infectious, not only may we be able to adopt certain precautions to prevent infection, but our treatment also may be influenced by our belief. We know full well that there are certain medicines which are known to be poisonous to some of the lowest forms of life; and such remedies, when inhaled, may act beneficially. Indeed, phthisical patients are regularly recommended by our best authorities to take long sea-voyages, and they often return much improved; and we naturally believe that the mode of living and the pure sea-air has cured the complaint. Is it not possible that the constant inhalation of an atmosphere impregnated with tar has had much to do with the cure?

Lately, I have been in the habit of recommending phthisical patients to use a medicated respirator; and the majority have certainly confessed that such use has lessened the cough and amount of expectoration to a remarkable extent. I have seen patients who have had most decided symptoms of phthisis, in the first and second stages, almost entirely recover. All the symptoms have disappeared, and nearly all the physical signs, to such an extent that they have been able to return to their former occupations. Certainly I have, in these cases, tried to improve the general health by other treatment as well; and I have seen cases of phthisis recover under such other treatment before; but, the difference in the number of successful cases has been so great, that one must come to the conclusion that the inhalation has had much to do with the recovery.

Dr. Mackenzie of Edinburgh has described an admirable naso-oral respirator, which acts well. It has two lateral expiratory valves, and two anterior; in front of the latter is a small covered chamber, in which the piece of medicated sponge can be placed.

We are apt to discard all new theories and all new methods of treatment, and we are not alone. Those who have gone before us have done likewise. We see theories, propounded by some, years ago, and then not received, brought forward in our day with additional explanations, and at once accepted by the profession. We know of remedies, recommended most earnestly by some before we were born, and then rejected, now-a-days brought before the notice of the profession, and becoming generally used. Owing to our advanced knowledge, we can now see what could not be appreciated before; and, in the interim, thousands have died whose lives might have been saved.