analysis. The formula shows the amount of each agent in each fluid dram of the preparation when ready for administration, the chemical compound being dissolved in sterilized oil.

℞ Iodin . . . . . gr. ½
Bromin . . . . . gr. 1/14
Phosphorus . . . . . gr. 1/100
Thymol . . . . . gr. ⅔
Menthol . . . . . gr. ⅔

The ingredients of the above formula are not prepared in common mixture, but are chemically compounded, with the result that the solution contains no free iodin or bromin, otherwise the pain following its use would be almost unbearable. The chemical solution is of a very bright cherry color, is distinctly transparent, and its hypodermic injection is attended with even less pain than attends the hypodermic injection of a solution of morphia. A common mixture of the ingredients of the formula produces a solution which is of a dark muddy color, is not transparent, and contains both free iodin and bromin. The above formula I perfected only after three years work, and though I was able to use the compound in the latter part of 1892, it was far from being an ideal chemical compound, and its use was both painful and very irritating locally. By careful study and continued experiment, I have succeeded in eliminating, one after another, the disagreeable and imperfect features of the solution, until during the past two years I have made but one change in the formula and that the addition of menthol. In 1895 I contributed an article to the *American Medico-Surgical Bulletin* descriptive of the use of this compound which was my first on the subject, and in this article gave my results from the treatment of fifty cases of pulmonary tuberculosis, which in brief showed nearly 90 per cent. of cures in twenty-one cases treated in the first stage of the disease, nearly 50 per cent. in fourteen cases treated in the second stage, while in the treatment of fifteen cases in the third stage none were cured, though several showed permanent improvement and are alive today. My success since the publication of the article mentioned has been in every respect equal, if not superior to the results here reported, and to this improvement I attribute the action of the menthol, which I thereafter added to the compound. There is one important feature of the action of the menthol in this compound, it is given off chiefly through the respiratory organs, and soon after taking the injection many can detect the odor of peppermint in the breath, which odor is more or less noticeable throughout the day. It has been shown recently that peppermint locally, by inhalation, is a valuable agent in the treatment of tuberculosis, and by this means the lungs are constantly bathed in atmosphere of menthol, with very decided benefit to the invalid.

By the use of this compound I have found it unnecessary to use any other medication, aside from that previously mentioned, and by relieving the stomach of the necessity of assimilating drugs, which can be hypodermically administered, an important point in favor of recovery is gained, and then also, by hypodermic medication, we are positive that a definite amount of remedial agents reach the system each day. The maximum daily dose of this compound, which on account of the contained chemicals I have named "bromin-iodin compound," is one dram. The fact that the patients report daily, with great regularity, for their treatments, and regularity is a factor notoriously abused by this class of invalids in taking medicines per stomach, has much to do with my successful results.

I use a special one dram hypodermic syringe fitted with oil-caliber needles, and usually give the injections in the back of the shoulder. So little local irritation occurs as a result of the injections, that many treatments may be given in a very small area, and I have yet to find the first invalid who can not stand the mode of treatment. The permanency of the recoveries which have occurred under this treatment is another special feature of the remedy. It seems to alter the general system to such an extent, and in such manner that the tissues and fluids of the body are fortified against re-infection. If proper care is taken of the syringe and needles, there is absolutely no danger of inflammation, induration or abscess as a result of the injections, with a properly prepared compound. The compound has proved of especial value in cases of tuberculosis with hemorrhages, and in a number of cases treated no hemorrhages occurred after the first week of treatment. I have every reason to believe that the proper use of bromin-iodin compound (and there is no reason why the general practitioner can not use the compound as successfully as a specialist), coupled with the system of general management and nutritive medication herewith outlined, will, if generally used, effect a decisive decrease in the fatality which attends the ordinary treatment of this disease.

80 Chestnut Street.

A REPORT OF THE TREATMENT OF PULMONARY TUBERCULOSIS BY THE INHALATION OF ANTISEPTIC VAPORS.

Read at the Meeting of the Mississippi Valley Medical Association in Louisville, Ky., October 8, 1897.

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CHICAGO, ILL.

The antiseptic value of drugs in the treatment of phthisis is well recognized by the profession. But how to administer them in sufficient strength and quantity to control the tubercular and septic processes has been the problem. If administered by the stomach in sufficient strength and quantity to properly saturate the lungs, the stomach and lower alimentary tract is so irritated that the digestive function is greatly deranged. Hence nature's method of controlling the disease by vital resistance is much impaired.

If introduced directly into the lungs by parenchymatous injection, so much irritation is produced that an exudate is thrown out which occludes the finer air passages preventing the introduction of the medicaments.

For two years I have had the medical direction of the Cook County, Illinois, institution. During this period I have treated a great many cases of pulmonary tuberculosis and have always given the patients the benefit of the latest researches of the profession. Each new hope has been inspired only to be soon blighted by some untoward effect. The class of tuber-

cular patients sent to the institution are far advanced in the disease and practically considered beyond human aid. They are simply abandoned by their friends and the physician to die. The inmates of the Cook County Infirmary number from 1,500 to 2,000, and of the Hospital for the Insane 1,400. Since about Feb. 1, 1897, all the tubercular patients have been isolated as much as possible. Since June 1, 1897, 260 patients have been persistently treated by the inhalation of antiseptic vapor, while general and constitutional treatment was followed. The diet for this class is a little better than for the other hospital ward patients. The vapor used consists of eucalyptol, oil of cloves, beechwood, creosote each 10 parts and liquid alboline 100 parts.

These medicaments are vaporized by compressed air of from fifteen to twenty-five pounds hydraulic pressure to the square inch. The vapor is respired from a mask fitting tightly over the nose and mouth and for a period of fifteen minutes each morning. While taking the vapor the patient is required to breathe as deeply as possible and as near the normal number of times per minute as he can. The vapor is not at all irritating and can be easily taken by the feeblest patients. From the 260 patients taking this treatment a clinical record of 40 cases has been kept, with reference to quantity and character of sputa and microscopic examination, temperature, pulse and respiration, cough, night sweats, physical examination and body weight. These cases were selected without any special reference to their condition. A study of the clinical record of these forty cases up to this time shows fairly good results. In every case the sputum is lessened in amount and a weekly examination shows a dimunition in the number of the tubercle bacilli, great benefit is given in the relief of the dyspnea and is the first relief spoken of by the patient.

The respirations become deeper and longer, the temperature less high in the afternoon, in cases where a considerable number of treatments have been taken, the cough and night sweats are much relieved and sleep is undisturbed. Physical examination shows the lungs to be clearing up, the râles disappearing and the respiration approaching nearer to normal and in many cases, an increase in body weight.

An example of which is given in the following four cases:

Case 1.—F. S. Age 41 years. Laborer. Family history negative. Personal history: has been addicted to strong drink. Was admitted December 1896; was coughing almost constantly. Night sweats were profuse. Sputa in great abundance and teeming with tuberculi and pyogenic bacteria. He was much emaciated and very anemic. Had had several hemorrhages and the respirations were short and jerky. He was sent to the tubercular ward and treatment began, which at that time consisted of the administration of beechwood creosote and guaiacol by the stomach—pushed to as much as the patient could stand. He was given a tonic of iron, quinin and strychnin three times daily. A cough mixture of carbonate of ammonia was used. Patient was confined to his bed. The diet was as stimulating as could be provided. Gastro-enteritis developed and all medication was discontinued, except the cough mixture and the tonic. He continued to fail. When the compressed air apparatus was first put in the hospital it was thought best not to give him the vapor, on account of his feeble condition. On June 4 a thorough physical examination was made and the sputa examined for tubercle bacilli, which were found in abundance. His weight was 129 pounds.

Physical examination.—The following physical examination was made September 29 and corresponds with the former save in degree. Inspection: Color normal. No pigmentation. Emaciation but not so extreme. Retraction of left side of chest with impaired motion. Supra- and infra-clavicular retraction. Palpation: No friction fremitus. Vocal fremitus not marked on either side, slightly less on left side. Percussion: Supra clavicular dulness bilaterally; slightly tympanitic note over anterior surface of chest on left side, due to lung retraction. General dulness over posterior aspect of chest. Axillary region, normal resonance. Auscultation: Respiratory murmur universally feeble, especially as heard over posterior aspect of chest. Expiration high pitched. Subcrepitant râles heard everywhere over anterior surface of chest. Vocal resonance increased bilaterally, more especially on left side. Pectoriloquy marked on left side over lower portion of lung. As ominous as this last finding may seem, this man has gradually improved and he now coughs very little, the night sweats are entirely absent, the respiration though still impaired is much improved. He has no hemorrhage. The quantity of sputa is small and the tubercle bacilli very few. In fact seven slides were examined before any were found. He feels much improved and has not spent a day in bed for two months. The P.M. temperature is two degrees less. He has taken 79 vapor treatments and weighs 133, a gain of but 4 pounds.

Case 2.—A. M. 56 years of age, Scotch blond, R. R. fireman. Family history good. Personal history: had syphilis twenty years ago. Has been coughing for two years. Was admitted May 18, 1897. At that time was so feeble that he was taken to the ward on a stretcher. Cough and dyspnea were so troublesome that he had to be bolstered up in bed nearly all the time. Had had hemorrhages and night sweats. Sputa were abundant and muco-purulent, and tubercle bacilli were found in great numbers. Weight 102 pounds.

Physical examination.—Inspection: Expansion very limited. Pigment over chest. Palpation: Vocal fremitus everywhere slight. Percussion: Dulness everywhere in greater or less degree except in axillary region. Slightly tympanitic in these regions. Dulness more marked in supra-clavicular regions anteriorly and posteriorly and over right middle lobe. Auscultation: Respiratory sounds very feeble almost completely absent over right middle lobe, vocal resonance being marked here, as well as lower posterior aspect of chest. Pleuritic friction well marked over apices, bilateral also on forced inspiration over lower extremities of lungs. Marked inspiratory dyspnea. This man has improved in all these conditions. His respirations are free. Has had no hemorrhage. Expectorates only in the morning on rising and then but very little. Four slides were examined on September 29, and bacilli were found. He has taken seventy eight vapor treatments and has gained twenty-one pounds since the first of June.

Case 3.—C. W. 44 years, German. Family history: Father died of pneumonia. Personal history good. Has been ailing for three years but has had no hemorrhage or night sweats. Cough was bad on admission in January 1897. At that time patient was feeble and anemic and expectorated great quantities of purulent matter, which was teeming with tubercle and pyogenic bacteria. Afternoon temperature ranged from 103 to 104 degrees. He weighed 105 pounds.

Physical examination.—Inspection: Color anemic. No pigmentation. Expansion limited, almost entirely absent on left side. Left side markedly smaller than right. Left shoulder drooping. Palpation: No friction fremitus. Vocal fremitus absent over anterior surface of chest on left side, also over left upper posterior aspect; normal over right side of chest. Percussion: Left supra-clavicular region flat, infra-clavicular region dull; gradually less dull down to third rib; right supra-clavicular region dull, below this resonant to sixth inter-space. Posteriorly: dulness over supra-scapular region on both sides; dullness marked over entire left aspect; normal resonant tone in left axillary region. Auscultation: Tubular breathing over the left infra-clavicular regions with faint moist râles. Suppressed high pitched respirations over remainder of left side and posterior aspect of chest. Normal vesicular murmur over right posterior aspect. Vocal resonance increased over entire lung surface. This man's physical condition has improved wonderfully. His temperature never goes above 99 degrees, coughs but little and expectorates scarcely any. Has had no hemorrhages and sputum is almost entirely free from bacteria. He has taken eighty vapor treatments and gained ten pounds.

Case 4.—S. D. Age 40. English, clerk. Family history: Two brothers and two sisters died of tuberculosis. Personal history: Single, habits good. Was compelled to stop work and was admitted June 8, 1897. Was anemic and emaciated, cough very troublesome; nocturnal perspiration exhausting. Was failing rapidly. Sputa contained abundant tubercle bacilli. He began to take inhalations of the antiseptic vapor at once and has persistently continued. Weight 130 pounds.

He is gaining steadily. Sputa and cough almost entirely absent. Dyspnea somewhat relieved. In all the following physical conditions he has improved.

Physical examination.—Has tuberculosis of the larynx. Color normal. Retraction of soft parts on inspiration more

marked in supra-clavicular regions. Left side smaller than right side. Percussion: Supra-clavicular flatness bilateral. Dulness everywhere except small area in axillary region on both sides, where a tone of hyper-resonance is obtained. Dulness more marked on left than on right side. Cardiac dulness extends about one inch to left of mammillary line reaching only to left border of sternum. Auscultation: Subcrepitant râles over apices, bilateral. Mucous râles over left lower lobe. Bronchophony marked over apices, increased elsewhere. Broncho-vesicular respiration over upper lobes bilaterally. Examination of a scanty amount of sputa on September 29 showed but few tubercle bacilli. He has taken 100 vapor treatments and gained 10 pounds since June 8.

While there has been marked improvement in the symptoms in every case, some have improved very much more than others. These were a most unfavorable class of patients to treat, being in the advanced stage of the tubercular process with hemorrhages, emaciation, night sweats, anemia and, in fact, scarcely able to breathe at all. In the absence of a specific for tuberculosis, we believe that with proper apparatus and skilful and continued administration much is to be hoped for in this class of patients by the inhalation of antiseptic vapor.

The respiratory movements so limited in tubercular patients are increased; the catarrhal condition of the upper air passages and especially in laryngeal tuberculosis is removed, thereby aiding better introduction of air into the lungs. The pulmonary air-passages are rendered and kept in a more aseptic condition thus minimizing the danger of new invasion. The alimentary tract is undisturbed by strong and irritating drugs, giving ample opportunity for the increase of vital resistance, by suitable diet and constitutional treatment.

The treatment of this class of patients by the inhalation of antiseptic vapor is both rational and practicable. For when the vapor is properly prepared and administered it is so fine and non-irritating and so intimately mixed with air that it must find its way to every portion of the lung substance that air in any form reaches.

I am fully convinced, from my short experience, that if the proper apparatus is used and the vapor not too strong, and given for from fifteen to twenty minutes twice daily, together with bitter tonics and supportive diet, great relief if not ultimate recovery may be brought to this unfortunate class of sufferers. It has been proved that when the vapor is properly prepared and administered that it reaches the minutest ramifications of the pulmonary air passages in the healthy lung. This fact being established it is no longer the question; how can medicaments be made to reach the alveoli? But rather, how soon will the therapeutists provide us with a specific for the tubercle bacilli? This done the dread malady of tuberculosis will no longer be credited with one-fourth of our mortality. That so large a number of cases have been relieved of their most distressing symptoms together with physical improvement, inspires a new hope and ambition for more thorough and extensive investigation. Any method of treatment that brings relief to the class of patients that I have treated gives bright promise for those in the incipient stage of the disease.

Orthoform in Tuberculous Laryngitis.—Neumayer announces that orthoform will relieve the pain which renders swallowing difficult in turberculous laryngitis, buccal ulcerations, cancer of the tongue, etc. The substance can be insufflated or the surface painted with a 10 per cent. solution of the hydrochlorate, renewing the application as often as necessary, orthoform being non-toxic. (*Vide* JOURNAL, Vol. 29, pages 700 and 1170.)

PULMONARY TUBERCULOSIS WITH SPECIAL REFERENCE TO DIET.

Presented to the Section on Physiology and Dietetics at the Forty-eighth Annual Meeting of the American Medical Association, at Philadelphia, Pa., June 1-4, 1897.

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The purpose of this paper is to set forth some practical observations acquired by direct clinical experience upon the treatment of pulmonary tuberculosis with special reference to the effect exerted upon it by a due application of certain dietary regulations.

THE NATURE OF PULMONARY TUBERCULOSIS.

Pulmonary tuberculosis is a true inflammatory process set up by a specific morbific influence in the delicate lung tissue and terminating in true ulceration and suppuration of the lung substance. I will briefly recall the anatomy of the lung. The trachea divides into the right and left bronchi. These divide again into secondary and tertiary bronchi, and the subdivision continuing, the bronchial tubes grow more attenuated and more numerous as they subdivide. They also grow more delicate in structure, and when finally they reach a minute size, they are comprised only of a thin membrane lined with pavement epithelium resting upon an elastic fibrous layer. They are then known as the ultimate bronchial tubes. Each one of these terminate in a lozenge shape islet of delicate pulmonary tissue called a pulmonary lobule. Each lobule consists of a vascular membrane in the form of a sac, from the cavity of which are numerous secondary compartments divided by thin partitions projecting from its inner surface. These minute cavities are pulmonary vesicles. Their walls are distensible and elastic, and expand and contract during the respiratory act.

These minute pulmonary vesicles are surrounded by capillary blood vessels which penetrate their partition walls. The abundant elastic tissue in the walls of these pulmonary vesicles gives to the lung its property of resiliency. These pulmonary vesicles are also called air cells or alveoli, and are largest at the apex of the lung and smallest in the interior. The aggregated mass of the pulmonary vesicles form the spongy or parenchymatous tissue of the lung.

The lung tissue is nourished by the bronchial arteries, which ramify upon the walls of the smallest pulmonary vesicles. The blood is returned through the bronchial veins. The pulmonary vesicles are supplied with lymphatics and nerves, the latter being supplied chiefly by branches from the sympathetic and pneumogastric.

The nature of pulmonary tuberculosis is an inflammatory process called into activity in these delicate structures by the introduction of a special microbe, the tubercle bacillus, which can flourish and multiply only when brought in actual contact with these sensitive and extremely attenuated membranes.

ITS CAUSE.

When this microbe has succeeded in gaining a lodgment upon the delicate pavement epithelium of a pulmonary vesicle, its specific action at once springs into activity, and this is first a congestion of the capillary vessels of the part, which is speedily followed by a true inflammation.