Caton's method differed from the old in that it consisted in a persistent and slight peripheral stimulus instead of a greater and more brief irritation.

THE INFLUENCE OF THE BACILLARY THEORY OF TUBERCULOSIS ON THE TREATMENT OF PHTHISIS.¹

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WITHIN the last few years all sorts of antiseptics have been recommended in phthisis; some as medicines, others for subcutaneous injection; others, again, for use as inhalations or even to be injected *per rectum*. Injections direct into the lung tissue were also practised. Some of the drugs employed had long been used in the treatment of phthisis, and had already gained a certain repute. Of these creasote and iodine may be taken as examples.

Creasote and its derivative, guaiacol—both used in the form of the carbonate—are now, perhaps, the most fashionable.² Theoretically, the attempt to kill or to prevent the growth of the bacillus tuberculosis within the body, by means of antiseptic or germicidal substances introduced direct to the affected part or carried there by the blood stream, is admissible. But the practical carrying out of this object is attended with great, and apparently insuperable, difficulty. No doubt if creasote, guaiacol, or corrosive sublimate (and many other substances) could be made to reach the bacilli in sufficient quantity the result would be the destruction of the micro-organisms and the arrest of the disease. This, however, would be at the expense of lowered vitality of all the tissues and a consequent predisposition of the individual—a matter of some importance to those undergoing treatment in a special hospital for consumptive patients.

The quantity of any germicide required to make the fluids of the body antiseptic is a bar to complete success. Estimating the amount of the blood at one-thirteenth of the body weight, this would give for a man weighing 9 stone nearly 10 lbs. of blood. To make a 5 per cent. solution, about half an ounce of the antiseptic must be dissolved in the blood, and this quantity must be maintained in spite of rapid excretion. Hölscher showed that we cannot effect this, although both he and Cornet succeeded in rendering guinea-pigs partially immune against tubercle infection by injections of creasote.

But supposing we can get sufficient antiseptic dissolved in the blood will it reach the bacilli? The pathological changes which occur in the immediate vicinity of these organisms result in early obliteration of the blood vessels of the part, and the consequent cutting off of the blood stream from the disease focus. This necessarily prevents any blood-borne antiseptic reaching the bacilli in the tuberculous centre. True, the margin of the tuberculous area still receives its blood supply, and extension of the mischief might presumably be checked. But the bacilli in the centre of this area, secure from flushing by an antiseptic blood stream, thrive and multiply; and when, in the natural course, the bloodless mass softens and breaks down, myriads of bacilli are suddenly let loose to be carried to other parts. Were it possible to have the whole body so impregnated with antiseptics as to ensure the immediate destruction of these micro-organisms, wherever they may be carried, we should soon clear the body of the bacilli. But how would the living cells of the body thrive on such an antiseptic liquid? These living cells are our natural protectors against the attacks of pathogenic organisms, and we want to promote their vigour and not to poison them with antiseptics.

We must be content with a less strongly antiseptic fluid in

the blood vessels, and at the best the bacilli will be "scotched, not killed." Antiseptic remedies cannot be relied upon as curative agents in pulmonary tuberculosis. Nevertheless, these drugs have a certain value in the treatment of consumption; and one object of this paper is to assign to these remedies their proper position, so that they may not be entirely discarded when the inevitable reaction against the antiseptic treatment of phthisis sets in.

Several observers have recorded beneficial results from certain of these antiseptic remedies, and this may in part be due to their possessing some action in destroying and nullifying the effects of secondary products of the growth of the bacilli, thus restraining the noxious agents which produce septicæmia. In this way they may prevent hectic, and the distressing symptoms which accompany high temperature. But perhaps the two great uses of antiseptics in phthisis are to prevent secondary infection by the air passages, and to destroy bacilli which have been expelled from the body. The latter object is attained by disinfecting the sputa; the former is, to a certain extent, possible by using antiseptic inhalations. In my opinion, inhalations are better for this purpose than antiseptic medicines which are excreted by the lungs; for, with the latter, in order to affect one organ we flood the whole body with antiseptics.

The best means we have for destroying the tubercle bacillus within the body exist in the action of the living cells and fluids of the body—the natural safeguards against deleterious germs. If we drench the tissues with antiseptics, we may diminish the vitality of the bacilli, but at the same time we impair the vitality of the "phagocytic" cells, and this not only at the disease centres, but throughout the body. We are then interfering with the natural means of cure, not assisting Nature; and whenever medicine is opposed to the natural process of cure, it is likely to do more harm than good. I have at different times given a fair trial to most of the special drugs which have been found successful by others; but in looking through my hospital records, I have not found one that gave results which justified expectations held out by their advocates.

The hospital to which I am attached is surrounded with pure air, of which we encourage the patients to take full advantage; a dietary is provided which is so generous that it is the despair of the Finance Committee; and as much comfort and cleanliness are maintained as is possible with the class of patients admitted. With such hygienic advantages medicines are chiefly required to help the patients to get the full benefit of these, to stimulate appetite, to aid digestion, and to ease cough—especially so as to give a fair chance of a night's rest. In the ordinary case, a simple tonic (acid and bitter), an expectorant when needed, perhaps cod-liver oil, and an antiseptic inhalation from an oro-nasal respirator worn for an hour twice or three times a day, give better results than any of the antiseptic drugs which we have tried.

The good effects recorded by so many observers from the use of creasote, guaiacol, and other antiseptics prove that these remedies are beneficial in some cases. But there is hardly a drug which has not been used in phthisis with more or less success. There is much significance in the following remark of one who records his success with creasote carbonate. Dr. Chaumier writes:³ "Those of my patients who obtained fresh air to the largest extent, and who tired themselves least, derived the greatest benefit from my treatment with creasote carbonate. With those, however, who lived in bad hygienic surroundings, and, in spite of the disease, were obliged to work the whole day, the condition remained the same, or became worse." These lines would, I believe, apply equally well to any drug treatment of phthisis.

Hygienic means furnish the most reliable treatment for phthisis, and the medicines employed should help the patient to derive the fullest benefit from these. The essential importance of strengthening the resisting power of the tissues may be overlooked in attempts to kill the tubercle bacillus by antiseptics.

It is impossible here to quote cases in support of the views I have expressed. These views are, however, the outcome of careful observation of several hundreds of cases, and of a dozen years of special hospital experience.

³ Reported in *Deut. med. Woch.*, No. 25, 1893, p. 611.

¹ Read in the Section of Medicine at the Annual Meeting of the British Medical Association held in London, July-August, 1895.

² The following antiseptics have been used:—(1) By the mouth: Phenol compounds—creasote, guaiacol, salol, benzozol, and their compounds; iodine compounds and iodoform; corrosive sublimate. (2) Inhalations: Carbolic acid, creasote, eucalyptus, bromine, iodine, iodoform, hydrofluoric acid, sulphurous acid, sulphuretted hydrogen. (3) Injections: (a) Hypodermic—creasote, guaiacol, eucalyptol, iodine; (b) into the lung—bichloride of mercury, iodine, iodoform, carbolic acid, creasote, turpentine; (c) *per rectum*—sulphuretted hydrogen.