abdominal hysterectomy, according to the period of gestation. Davis writes: "Under the improved methods now followed in performing total extirpation the prognosis for the mother is no longer desperate, a fair chance for recovery from the operation and the prolongation of life being given her." I

would venture to submit that by supra-vaginal amputation in such a case as my own the prognosis is by no means desperate, and, as in supra-vaginal amputation apart from pregnancy, the chances of immunity from early recurrence are distinctly good.

Cases of Pregnancy complicated by Cancer of the Uterus.

Operator.	Nature of case.	Operation.	Result.
Lewers: Diseases of Women, 1893, p. 240.	Aged thirty-nine years; four months pregnant; cauliflower-like outgrowth from the cervix.	Outgrowths removed by écraseur and uterus cleared out. Supra-vaginal amputation eighteen days later. Severe hæmorrhage at second operation.	Recovery from operation; died in a tainting fit some months after.
Lewers: Transactions of the Royal Medical and Chirurgical Society, vol. lxxvi., p. 101.	Aged forty years; three months pregnant; moderately large cauliflower growth chiefly affecting the posterior lip.	Supra-vaginal amputation with cautery; aborted two days after.	Quite well three and a half years after operation.
Siegfried Stocker of Lucerne: Centralblatt für Gynäkologie, No. 32.	Aged thirty-six years; six months pregnant; mass projecting into the vagina was breaking down.	Uterus containing fœtus (with exception of the cervix) removed through abdomen, and cervix removed per vaginam.	Recovery.
Bischoff.	Near end of pregnancy.	Freund's operation.	Died same day.
Schröder.	Near end of pregnancy.	Freund's operation.	Died same day.
Hofmeier.	Second month of pregnancy.	Vaginal hysterectomy.	Unknown.
Sir Spencer Wells: THE LANCET, Nov. 26th, 1881.	Sixth month of pregnancy.	Freund's method.	Recovered from operation, but soon died from recurrence.
Zweifel of Leipzig: Centralblatt für Gynäkologie, No. 12, 1889.	Sixth month of pregnancy.	Operation like Stocker's.	Unknown.
Löhlein: Centralblatt für Gynäkologie, March 7th, 1891.	Aged forty-three years; firm mass occupying posterior part of the cervix; came under observation a month before completion of term.	Vaginal hysterectomy a month after labour.	Recovery.
Greig Smith: THE LANCET, Jan. 1st, 1887.	Aged thirty four years; growth in the cervix the size of a tennis ball; pregnancy only suspected.	Intended to perform supra-vaginal amputation if the disease was not too extensive, but as it was did vaginal hysterectomy; the uterus was found to contain two fœtuses of the second month.	Recovery; case reported three months after operation.
Taylor of Japan: Medical Record, 1890, vol. i., p. 259.	Aged forty-one years; whole uterus seemed affected by malignant growth; pregnancy only suspected.	Vaginal hysterectomy; two months fœtus found; growth involved the cervix as far as the internal os; the bladder was torn in operation.	Recovery.
Vander Veer: Journal of the American Medical Association, vol. xix, p. 15, 1892.	Aged twenty-seven years; cauliflower growth from cervix; pregnancy not suspected, but enlargement of body supposed to be extension of disease to the fundus.	Vaginal hysterectomy; fœtus of two and a half months found.	Recovery.
Bedford Fenwick: Brit. Med. Jour., 1889, vol. ii., p. 1396.	—	Vaginal hysterectomy at the second month because cervix had been amputated for cancer before pregnancy began, and it was impossible to find any trace of the os through which to procure abortion, as was desired. There seems to have been no cancer present at the time of hysterectomy.	Recovery.

Clifton. Bristol.

ON ANTISEPSIS AND ELIMINATION IN PULMONARY PHTHISIS.¹

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IT has frequently been remarked that although the parasitic origin of phthisis has now been firmly established for many years, and antiseptic methods based upon the discovery of the tubercle bacillus have been widely employed, these methods have not yet proved as successful as one might wish, and the mortality from phthisis still remains a formidable item in our vital statistics. There seem to me to be several good reasons for this want of success; and it will, I think, be profitable to refer to them seriatim, together with the best methods known to me for obtaining better results. In doing so, I shall have to mention much that is already familiar to you and shall be compelled by the exigencies of time to omit many illustrative cases which it would have been interesting to consider.

1. In the first place, antisepsis is only one of several factors essential to success. The tubercle bacillus (like

the mildew in an ill-ventilated greenhouse) only attacks damaged tissues or organisms living in unhealthy conditions. To give antiseptic methods a chance we must also attend to hygienic factors. This very often involves a complete change in occupation and habits of life which is extremely difficult to effect. It is not my intention to go into details on this occasion respecting the prophylaxis and hygienic treatment of phthisis or to consider climatic treatment or that modification of it which can be effected without removal from this country. These are matters which are well known and would take too long to consider in detail. Dr. W. R. Thomas² some years ago said that most of his cases of phthisis resulted from one of three causes—namely, a dusty atmosphere, unresolved inflammatory consolidations, or inherited defect. There is much force in this remark; but we may, I think, with advantage change the third heading into "depressed vitality, congenital or acquired." It should be our constant aim in the treatment of phthisis to provide fresh air free from dust, to quickly cure all inflammations, and to improve the nutrition by all the means in our power. The means of improving nutrition are many and various, and I will only mention two which are apt to be lost sight of—general massage with rest and full diet, and cold sponging or other stimulant hydro-therapeutical methods. The extraordinary improvement which occurs in cases of nervous

¹ A paper read before the Chester Medical Society on June 16th, 1896.

² Brit. Med. Jour., 1884, vol. i., p. 352.

debility when subjected to the Weir-Mitchell treatment must have been seen. I have had some exceedingly striking cases, which, however, I will not now mention as the most remarkable were non-phthical. But many phthical patients in an early stage who are free from fever, but are too thin and deficient in appetite and vigour, would be benefited by such a course of treatment suitably modified; and although it would be out of the reach of the poor it is quite possible by good management to carry out such treatment properly for a very moderate sum. I must, however, utter a warning, if a warning be necessary, against attempting massage without rest and high feeding, whether in phthical or other patients. I have heard of disastrous results from the neglect of this rule. There is an analogy between the Weir-Mitchell treatment and the modern methods in the treatment of phthisis. In both cases there is waste material to remove, energy to economise, and nutrition to improve; and in both cases supply must at least keep pace with expenditure.

2. Another reason why antiseptic methods do not always succeed is because they are not applied early enough. Medical men are fully aware of the importance of early treatment, but the public do not sufficiently realise that the best time for systematic treatment is before there has been a decided failure in nutrition. We must be on the look-out for tubercle in all cases of anæmia or debility, amenorrhœa or dyspepsia, which do not promptly yield to treatment. I had a young man under observation for many months in whom an obstinate anæmia made me suspect the presence of tubercle. There was for a long time no cough or expectoration; but after six months I detected a patch of harsh breathing, with increased vocal resonance in one interscapular region, so that I at once put him on special treatment. The thermometer will, of course, often help in the diagnosis of doubtful cases.

3. In the next place, failure may arise from insufficient thoroughness and duration of treatment. Temporary improvement is very common under treatment in phthisis; but the precautions are relaxed, the treatment suspended, and a relapse takes place. Such disappointments are especially common in hospital practice, and I think all subjects of suspected phthisis, whether hospital or private patients, should be warned to continue attending for at least a twelve-month.

4. Some relapses, however, are really due to re-infection. Evidence is steadily accumulating which shows that phthisis in the absence of special precautions attaches itself to houses,³ so that to guard against re-infection proper disinfection and scrupulous cleanliness are essential. So far as adults are concerned, the main danger lies in the drying and pulverisation of tuberculous sputa, so that these should always be disinfected or destroyed and dust systematically removed from walls and floors. Washable walls are much to be desired in the rooms occupied by tuberculous patients. Dry dusting is objectionable and should be prohibited. It is in consequence of such precautions that the spread of phthisis is so seldom observed in consumption hospitals, and similar precautions generally enforced in some parts of Germany have led to a striking diminution in the mortality from tuberculous diseases. If a death from phthisis takes place thorough disinfection is essential. Gaseous disinfectants are not to be trusted. A solution of chlorinated lime is more reliable for walls than corrosive sublimate or carbolic acid, as mercurial preparations are apt to be reduced by organic matter, and carbolic acid unless concentrated is slow in action. Sputa should be destroyed by boiling or burning, Japanese paper handkerchiefs or suitable spitting flasks being preferably used.

5. Relapses in phthisis are also frequently caused by intercurrent attacks of other diseases such as pneumonia or influenza. A patient under my care was doing admirably and seemed to be nearly well, when he was obliged to work early and late for several weeks in an ill-ventilated office. Owing to faulty drains under repair the doors and windows were kept closed, and three or four devotees of the weed kept the office well filled with tobacco smoke. My patient got a smart attack of congestion at the base of the lung, with the sore-throat so common where drains are faulty; and the tuberculous process took such a hold that his recovery was seriously jeopardised. Eventually there was sufficient improvement to warrant his going to South Africa,

whence I have lately received most satisfactory reports of him. The treatment of phthisis is largely that of inflammatory complications. All morbid secretions from mucous membranes may be regarded as so much culture fluid for the tubercle bacillus, so that it is a substantial gain when we can dry them up or expel them. Coghill has rightly objected to the frequent or habitual use in phthisis of opiates, which should be reserved for the treatment of useless, ineffectual cough, while antiseptic inhalations are far better for regular use. Too little attention has, I think, been paid to the action of the respiratory cilia, which are most important agents in getting rid of secretions from the bronchial tubes. Chloroform and other sedatives which check ciliary action should, I think, be used with great caution. In the later stages it is of importance to regularly adopt such positions as will drain the cavities, even at the risk of exciting cough. The clearing cough in the morning should be encouraged and every effort made to get rid of the accumulated mucus. When this has been done some sedative will be useful to soothe the mucous membrane and quiet the nerve centres and prevent vomiting. The use of expectorants should be regulated by similar principles. So far as they increase secretion they are likely to do mischief; but such an increase is often the only way of expelling more noxious matters. I am not in favour of continually employing expectorants in phthisis, but they are, I think, useful occasionally. Chills also tend to increase the secretion from the respiratory passages, but it is better as a rule to train the skin by douches and other means to accommodate itself to differences of temperature rather than to keep the patient in-doors. Even in febrile stages phthical patients can stand a good deal of fresh air, provided they are clad in woollen garments and kept out of cold draughts. Foul air is more dangerous than cold air, and staying in-doors increases the tendency to catch cold. Generally speaking, the intercurrent pulmonary complications of phthisis call for treatment which shall limit the secretion and hasten its disintegration and expulsion; and for such purposes we are obliged to trust largely to remedies which are not primarily antiseptic.

6. As regards the tuberculous consolidations themselves there are two natural methods of cure—by fibrosis and calcification or by softening and expulsion. Where the first of these tendencies exists little need be done beyond paying attention to the nutrition and to hygienic matters. Antiseptics may be useful, but are probably not essential; and such other remedies as are used should be chosen for their tendency to promote calcification or improve the general nutrition. Lime salts, such as the phosphate or chloride, may be useful in promoting calcification, but I do not know of any exact evidence on this point. It has been stated that there is increased elimination of lime salts through the urine in phthisis. If this be correct an adequate supply of such salts in the food or otherwise is probably essential. Phosphate of lime is said also to stimulate cell nutrition. The chloride of calcium was a favourite remedy with Begbie⁴ in various scrofulous disorders. Parrish's food, which also contains calcium phosphate, is widely used in the same class of cases. Dr. Albert Robin⁵ uses the glycerophosphates wherever nitrogenous metabolism is defective or the nervous system is ill-nourished, whether from exaggerated loss or insufficient assimilation. The glycerophosphate of lime should be useful in chronic quiescent phthisis, but I have no personal experience with it. Where, however, from the progress of the local disorder it is clear that softening will take place we should guard against the dangers of extension and systemic poisoning by the timely administration of antiseptics and antipyretics. In many cases we can also increase the chances of recovery by hastening the process of softening, just as in the intercurrent inflammations already alluded to. The remedies which may be used for this purpose, several of which are also antiseptics, are mercurials, iodine and iodoform, arsenic and hypophosphites, and tuberculin. Mercurials, although useful in the treatment of local and accessible tuberculous diseases, do not seem to me to be of much value in pulmonary phthisis, probably because their disintegrating action is too indiscriminating. The combination which I have tried is that of liquor hydrargyri perchloridi with perchloride of iron. Iodine and iodides are valuable in

³ Ransome: *Ibid.*, 1892, vol. ii., p. 172; also *Medical Chronicle*, October, 1892.

⁴ Warburton Begbie's Works, New Sydenham Society, p. 307.

⁵ *Bulletins Généraux de Thérapeutique*, 1895, vol. xviii., p. 385, and vol. xx., p. 433.

increasing the fluidity of the sputa and in breaking down damaged epithelium. They are, however, apt to cause catarrh in some patients. Veitch states that iodism can be prevented by the addition of morphine or atropine,⁶ but I have not tried this combination in phthisis. Iodoform, which has been much used and strongly recommended by Dreschfeld and others,⁷ is probably converted into iodine in the system. It is more slowly eliminated than the iodides and consequently is more continuous in its action. It may be administered in the shape of pill or subcutaneously. Iodol is still more slowly converted and excreted.⁸ I am unaware of its having been given by the mouth in phthisis. I was rather disappointed with iodoform in my own practice, but am not sure that I increased the dose sufficiently. Arsenic and hypophosphites, although regarded as tonics in small doses, probably act in part as disintegrating remedies. They are said to diminish oxidation and to induce fatty degeneration, and as their main action is on epiblastic tissues they should be specially useful in the early catarrhal stage of phthisis, which is confirmed by clinical experience. I am inclined to think that calcium hypophosphite is preferable to the sodium salt in phthisis. Tuberculin has at the same time the most powerful and the most selective action of all the disintegrating remedies. It kills the cells which have been irretrievably damaged by the tubercle bacillus and excites inflammation round the dead mass. Owing to its use in unsuitable cases it has fallen into disrepute, but if judiciously used it may be of considerable value. It is seldom a safe remedy in out-patient practice, and should only be used in an early stage and where the patient is placed under good hygienic conditions and continually under observation. By the use of tuberculin we convert a chronic into a sub-acute process, so that the precautions necessary in the case of all disintegrating remedies are especially important where tuberculin is administered. One danger in the use of disintegrating remedies is that of hæmorrhage, but this is seldom formidable, and may, I think, be usually disregarded and dealt with on ordinary principles when it happens. Another, which is almost inseparable from their use, is the absorption of toxins, which cause fever and depression of strength, together with various other symptoms which are sufficiently familiar. And so far as the removal of necrosed tissue is effected by internal absorption there is danger of bacilli being carried off by wandering cells and retaining sufficient vitality to start fresh foci elsewhere. Some of Virchow's post-mortem examinations after the use of Koch's tuberculin have shown that this may take place, but Watson Cheyne's observations teach us that it is not a necessary consequence. Still, it will be wiser when we use any of these remedies to take all possible precautions against the above-mentioned dangers, and this we can do to some extent by the use of antiseptics and of remedies (such as antipyretics and anti-hydrotics) which counteract some of the effects of the toxins. If the disease be extensive no antiseptic can be depended upon to fight the battle unaided; but if a large part of the diseased tissue be expelled by other means there are several antiseptics which will give most valuable assistance in dealing with what is left. The use of such antiseptics should be begun, if possible, before the softening stage is reached, and continued after apparent recovery to prevent relapses. There is abundant evidence that the tubercle bacilli may remain quiescent for long periods in glands and some other parts of the body; and although we do not know how far this takes place in caseous masses in the lungs it is well to be on our guard. Such masses cannot be scraped and dressed like a diseased joint or lupus patch, but have to be slowly absorbed by the ordinary vascular channels if they have not been completely expectorated, which is exceptional. And so long as this process of absorption goes on, so long is there a danger of recrudescence to be guarded against. The most useful antiseptics for our purpose are the creasote group, iodine and iodoform, eucalyptus, and some other essential oils, quinine, the salicine group, and mercurials. Some others are useful for intestinal antiseptics, but have little effect on the lungs. Antiseptics for internal administration in lung disease should be fairly diffusible, and be naturally

eliminated, at least in part, by the lungs; and it is noteworthy that most of the remedies I have just mentioned have these two properties. Quinine and the salicine group are, I think, most useful for occasional administration as antipyretics. It is a common practice to give quinine a few hours before the expected rise of temperature during the febrile periods of phthisis; and Coghill has recommended it to anticipate the reaction after tuberculin. It probably helps to prevent unduly low as well as unduly high temperatures, and by its restraining action on leucocytes will help to prevent excessive inflammatory reaction. Salicine and the salicylates are mainly of use in treating the fever of the septic stage. Several other antipyretics have been administered in phthisis, but owing to their depressing effects it is doubtful whether they do any good. According to E. F. Grün⁹ acute bronchitis is due to a bacillus which is prevented from growing by acetanilide. Should this be confirmed it would be an indication for the administration of the drug during bronchitic complications in phthisis. Guaiacol and beechwood creasote are useful in restraining both the fever of consolidation and the septic fever in phthisis. Guaiacol may be painted on the skin of the chest or elsewhere (15 to 20 minims) and covered with oilskin. It may also be injected deep under the skin either pure or (as I have usually done) dissolved in a little sterilised sweet almond oil. Coghill¹⁰ states that it has a very marked effect in improving the condition and lowering the temperature in acute phthisis. In the same class of cases McCall Anderson¹¹ has been successful (in 6 out of 8 cases) with quinine and digitalis. In acute or sub-acute one-sided attacks the method of strapping the chest advocated by Dr. Tidy¹² of Florence would probably be useful. Although the healthy lung should be expanded as systematically as possible the inflamed part would be far better kept at rest. Bearing in mind the probable action of tuberculin the treatment of subacute or acute phthisis becomes of the greatest importance, and one or other of these methods would be worth trying after using tuberculin if the reaction were marked. In the treatment of more chronic cases I have had most experience with creasote and guaiacol. These drugs, in addition to their action as antipyretics, diminish secretion from pulmonary cavities and appear to have a marked inhibitory influence over the spread of tuberculosis. How this is effected is still a matter of doubt. Guttman¹³ found that 1-4000th part prevented the growth of bacterial cultures, and he and others have tried to do the same thing in the human body by giving large and increasing doses of the drug. If it were necessary to keep the body (or even its fluids) saturated to the same extent it would undoubtedly be necessary to give very large doses. But there is good evidence that quite small doses given for long periods of time are beneficial. Bouchard and Sommerbrodt obtained their earlier successes with small doses, which shows that either a small dose will sufficiently modify the tissues to render them an unfavourable soil for the growth of the bacilli or that the drug is concentrated on specially threatened parts; or perhaps, as Hudeod¹⁴ supposes, the action is not so much on the bacillus or the soil as on the toxins resulting from the action of the bacillus. We may, I think, dismiss all idea of directly killing the bacillus in the body. The most that can be expected from antiseptics is that the bacillus should be rendered less active or less virulent. It is also possible that the constriction of bloodvessels by guaiacol may have something to do with the effect. Although the bacillus protects itself against the contact of blood as such it needs a plentiful supply of nutrient fluid which must be derived in the lungs from the bloodvessels. If these were constricted the effect would be greatest where endarteritis was present, so that a relative starvation of the bacillus might follow. It is noteworthy that, according to the late Dr. Bristowe, the most useful drugs in tuberculous meningitis are those which constrict bloodvessels. Ichthyol, which acts in this way, has been used by Scarpa¹⁵ in tuberculosis with apparently good results. When creasote is used it is important to see that it is beechwood and not coal-tar or pinewood creasote. The substitution of coal-tar

⁶ THE LANCET, June 13th, 1896.

⁷ Shingleton Smith: Brit. Med. Jour., vol. ii. 1834, pp. 422, 906. Dreschfeld: Ibid. vol. ii. 1832, p. 169, and vol. i. 1883, p. 817. Ransome: Ibid. vol. i. 1884, p. 8. Semmola: THE LANCET, Aug. 26th. 1882, p. 323.

⁸ See Wood's Therapeutics.

⁹ THE LANCET, June 27th, 1891, p. 1424.

¹⁰ Brit. Med. Jour., vol. i. 1896, p. 586.

¹¹ THE LANCET, March 24th and 31st, 1877, pp. 413 and 451.

¹² Brit. Med. Jour., vol. i. 1896, p. 721.

¹³ Zeitschrift für Klinische Medicin, Band xxii., p. 488.

¹⁴ Créosote et Tuberculose, Genève, 1893.

¹⁵ Gazzetta degli Ospedali, 16 Mar., 1895.

creasote for that derived from beechwood appears to have been one reason why the remedy fell into disrepute until revived in the seventies by Bouchard and Gimbert.¹⁶ Dr. Chaplin appears to have used inhalations of creasote in a specially constructed chamber at Victoria Park Hospital; but coal-tar creasote is stated to have been used.¹⁷ Beechwood creasote contains from 60 to 70 per cent. of guaiacol, together with smaller quantities of cresols. Pinewood creasote contains far less guaiacol. Coal-tar creasote contains plenty of phenol, but little or no guaiacol, and is far more poisonous. The methods of administration are various; it will often be useful to combine several in the same case. As a rule I begin with the administration by the mouth. Most patients can take it readily in this way, which has the advantage that it disinfects the sputa which have been accidentally swallowed and diminishes the risk of intestinal complications. Habit and idiosyncrasy are both very potent in the taking of creasote. Beginning with small doses (from two to four minims three times a day) and gradually increasing, large quantities can usually be tolerated. A medical friend tells me that one of his patients—not a tuberculous one—took creasote by the teaspoonful without any ill-effects whatever. On the other hand, a case is on record of death from eighteen minims.¹⁸ This must have been due to impurity of the drug or to idiosyncrasy. Whatever the explanation the danger can readily be avoided. The dose which can usefully be taken varies in different cases and can only be determined by observation of the effects of an increasing dose. To obtain good results in some cases large doses are probably required. Now Poggi's experiments with guaiacol (which are probably applicable to creasote) show that not more than from fifteen to twenty minims are absorbed per diem by the alimentary canal,¹⁹ so that bigger doses are of no advantage when given by the mouth; and where more is required it must be administered by the skin. Creasote is rapidly absorbed and rapidly excreted, partly by the kidneys, partly by the lungs and other surfaces, so that frequent doses are indicated. If the kidneys are unsound the drug must be very cautiously administered. Undiluted creasote or guaiacol is somewhat burning and irritating to epithelium. I am, therefore, in the habit of giving it well diluted directly after a meal. In my experience it is not so well borne in the shape of pills or capsules. As a rule only small doses can be given in oleum morrhue, but from ten to thirty minims per diem can usually be reached without any drawback if combined with glycerine and spirit and stirred up in a tumblerful of milk. This has the additional advantage of increasing the quantity of easily digestible food taken. I usually begin with two or three minims three times a day and increase up to six or eight minims. I see no special advantage in rectal administration. Another method of administration is by the skin. For this an ointment may be made with lanoline and almond oil together with 5 per cent. creasote. Or the drug may be painted on pure or mixed with sweet almond oil and covered with gutta-percha tissue. I have too small an experience of these methods to be able to judge of their value.

The hypodermic method, with which I am more familiar, was the subject of a paper read by me at the annual meeting of the British Medical Association last year.²⁰ I have used 1 in 5 and 1 in 15 solutions of creasote or guaiacol in sterilised almond oil, injected either with a large-sized hypodermic syringe or with a special apparatus of French manufacture. If the doses are gradually increased enormous doses will be sometimes tolerated—e.g., nearly eight ounces of a 1 in 15 solution. With these large doses it is especially important to inject very slowly and in cold weather to warm the solution. I have known faintness to occur after a very small dose, probably because it was injected too fast or too near the skin. The bulk to be injected is an important consideration, as a large injection will take a very long time to introduce. But, on the other hand, it is an advantage to introduce large quantities of oil into the body in phthisis in such a way as will not upset the stomach. Where objections are raised to the hypodermic method and sufficient doses cannot be taken by the mouth other allied preparations have to be given instead. Guaiacol is in my experience rather better borne than creasote. The carbonates of these drugs, which as a rule pass through the stomach and are split up in the bowel, with

liberation of creasote or guaiacol, are a useful alternative. Where fermentation is present in the stomach the liberation will be effected earlier, with good results on the gastric disturbance. Benzozol is also similarly acted upon in the bowel. I have no experience with it, but it has been favourably reported upon. Where large doses are required, however, none of these substitutes, if given by the mouth, will replace the hypodermic administration of guaiacol, as there is a limit to the amount absorbed by the alimentary canal. Difficulties in the administration of guaiacol by the mouth or subcutaneously may usually be overcome by very gradually increasing the dose. Where there is real intolerance of the drug some other, such as iodoform or eucalyptol, will have to be tried. The chief symptoms of intolerance are faintness and depression of temperature and strength, with sometimes mental symptoms. One of the Continental observers²¹ likens it to the collapse of pernicious malarial fever. I have not so far met with absolute intolerance of the drug, although temporary intolerance is more common. As a rule it is well borne and diminishes cough and expectoration, dries up moist sounds, increases the appetite, and keeps down the temperature.

A girl aged twenty years, who looked about fifteen years old, consulted me in June, 1895. Her father had died from phthisis, and she herself had been steadily losing flesh and strength for four months. She was very anæmic, with a hectic flush, feverish at nights, miserably thin, and ill-developed about the chest. There was well-marked consolidation of the left upper lobe and the apex of the left lower lobe, with imperfect entry of air and squeaking inspirations over the affected areas. She was put on to creasote and cod-liver oil, iodine painting, and plenty of fresh air. In October she looked fat and healthy, had very little cough, slept well, ate well, and felt well. The squeaky sounds were heard over a smaller area, and there was no evidence of softening excepting at the apex of left lower lobe. In January of this year there was no active mischief excepting a patch of crepitations near the left anterior axillary fold, and no evidence of cavities anywhere. She is still attending, and bids fair to make a complete recovery.

In this case creasote was for a time only given by the mouth, but I very often at the same time order inhalations or instillations. These will not, I believe, replace the administration by the mouth, but are rather intended to act upon the respiratory surface and its secretions, while very little is absorbed into the system, and the deeper tissues are little if at all affected. Of the three chief methods of discontinuous inhalation, instillation, and inhalation in special chambers, the second is in practice the most convenient, although the others have their advantages. Inhaling respirators should be capable of thorough sterilisation and their textile parts should be regularly destroyed and replaced. A simple and efficient one may be readily made from a piece of copper wire, two pieces of linen, and two tapes. For men with moustaches the wire may be dispensed with. Its object is to prevent contact of the wetted surface with the sensitive skin of the lips. If sufficiently saturated there is usually no need of an oro-nasal respirator, which is necessarily more clumsy and conspicuous. Inhaling respirators should be worn day and night. Their object is to enable the patient to constantly breathe a medicated atmosphere without being confined to the house. Where this cannot be done the inhaling chamber will have to be tried, with special schemes for ventilation, such as have been introduced into one or two hospitals for phthisis. This, however, is too large a subject to enter into now. For discontinuous inhalation a wide-mouthed bottle with two glass tubes and a rubber cork, fitted with rubber a tube and mount, will answer very well. Such a bottle may be half-filled with antiseptic and stood in hot water every time it is used. By this means the air above the antiseptic is sufficiently impregnated for practical purposes. Creasote or guaiacol may be used pure in these ways or dissolved in rectified spirits. The latter is best where instillations are used. In addition to guaiacol or creasote, phenol and menthol may be usefully employed for instillations. Eucalyptol and various essential oils also lend themselves well to this method, and where softening processes are tardy iodine may be added. Medicated steam inhalations are usually best avoided in phthisis.

To sum up, it appears to me that the antiseptic method

¹⁶ Bulletins de Thérapie, tome xciii., p. 289.

¹⁷ Harris and Beale: Treatment of Pulmonary Consumption, p. 342.

¹⁸ Zawadzki: Therap. Monatshft., 1894, No. 18.

¹⁹ Riforma Medica, Aug. 10th, 1892.

²⁰ Brit. Med. Jour., vol. ii. 1895, p. 1488.

²¹ Burlureaux. La Pratique de l'Antisepsie, Paris, 1892, p. 199.

is of real utility in phthisis, but cannot be alone depended upon. Hygienic treatment is of the first importance. Nutrition must be improved by administration of cod-liver oil and other familiar remedies. Symptomatic treatment directed against profuse night-sweats, diarrhoea, and other troublesome symptoms is also of great importance. Inflammatory complications must be attended to in ways calculated to diminish excretion or to bring about the speedy expulsion of peccant matter. Early quiescent cases are best treated by expectancy, but where softening is tardy it may with advantage be hastened by the administration of resolvent remedies—preferably, as a rule, those which are also antiseptics; and during the whole time of treatment antiseptics should be regularly administered in doses gradually increasing up to a maximum which varies with each case and continued for some time after the appearance of dry sounds in the chest. Given continuously from an early stage and for long periods in substantial doses antiseptics will decide the battle in favour of the patient, and in a large proportion of cases bring about a relative or even an absolute cure. But a half-hearted administration and the neglect of other well-ascertained methods of treatment will throw doubts on the value of the remedy employed and only lead to failure. The choice of the antiseptic and the method of administration will depend on idiosyncrasy and the peculiarities of the particular case, but in most cases it will be advisable to give it by inhalation and also either by the mouth or under the skin. If I have dwelt most on guaiacol and creasote it is because hitherto the best results have apparently been obtained from these and because I am most familiar with them, but I do not deny that other antiseptics are sometimes of the greatest utility.

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DEFECTIVE METABOLISM IN ITS RELATION TO GOUT.¹

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THE normal metabolism of the human body, both as regards tissue change and the elaboration of the alimentary substances introduced from without to maintain the tissues, does not produce any disturbing effects on the organism of a healthy individual. By a perfect metabolism we mean a perfect functioning of all the various physiological processes that take place in the body. For convenience of classification we group these processes under anatomical heads called systems, all interdependent on each other in maintaining the health of the individual, so that derangement in any one of them is followed by imperfect functioning of the others. In this paper I am only concerned with those systems that seem to me to be mainly responsible for the production of a vicious change in this metabolism, leading to what we understand as uric-acid-æmia or gout. According to the most recent views gout is due to over-production of uric acid which is driven from the blood in consequence of that fluid becoming sub-alkaline and consequently incapable of holding it in solution. It then precipitates itself where the blood-stream is slowest and weakest, carrying with it some of the soda salts of the blood and robbing the tissues around it in its new resting-place of all their alkaline salts. It may either return again to the blood when an increased alkalinity of that fluid tempts it back, or it may remain in its resting-place if a sub-alkaline condition of the blood continues. All recent writers on the subject are nearly agreed as to this being the condition of affairs in gout, but they are not agreed as to why uric acid in excess should be present in the blood, and it is on this aspect of the question that I venture to offer some remarks.

According to those who regard the question from a merely chemical point of view the excess of uric acid is due to the food ingested being too highly nitrogenous and to the blood being low in alkalinity, so that it becomes an insufficient

solvent for the uric acid which is formed out of the compounds of urea at or in the renal barrier; the kidneys accordingly fail to eliminate it, and it is carried back again into the circulation by the renal veins. Others explain it by the individual possessing an hereditary tendency to form uric acid in excess and the kidneys failing in elimination it gradually accumulates in the blood. The rational treatment of gout from a purely chemical point of view consists in giving alkalies, or alkaline salts, that render the blood more alkaline and dissolve uric acid, so that it is eliminated by the kidneys and appears in increased quantity in the urine. But after a little time the gouty symptoms return, and then the thoughtful mind inquires what causes other than mere chemical ones will explain this vicious recurrence. Nearly every writer on the subject since Garrod discovered uric acid in the blood of the gouty has formulated theories to account for its presence and its over-production. Imperfect oxidation of urates, put forward by Murchison and advocated by Garrod and later writers, certainly seemed to take hold of the professional mind and has many strong advocates at this day. Lately Harbaczewski, from chemical investigations, has brought forward the view that uric acid is the metabolic product of nuclein derived from leucocytes. Its increase in the blood and urine in leucocythæmia and in pernicious as well as in other forms of anæmia lends strong support to his opinions. All cases of gout are, however, not accompanied by symptoms of either leucæmia or pernicious anæmia, though a transient anæmia is very frequently associated with the first symptoms of an excess of uric acid in the blood, and one form of gout—that known as atonic gout, occurring in the flabby and lymphatic—is characterised by anæmia as a marked symptom. Harbaczewski's theory as to the source from which this excess of uric acid is derived applies to only one of the great physiological systems—the circulatory one; but, in my opinion, defective metabolism in others exercises from time to time a preponderating influence in this excess, and it is with a view of calling attention to this that my remarks principally apply. The inquiry will necessitate a review of all the various physiological processes of the body, defective metabolism in which adds to the blood the various compounds of urea in such quantities that the excretory organs, especially the kidneys, cannot deal with it, and form uric acid from the soluble urea compounds. Lithæmia is but the first evidence of lessened metabolic activity, and as age increases this lessened activity increases with it until one of the most simple metabolic processes in the body—the conversion of proteids and waste products into urea—becomes a complicated one, leading to a gradual auto-intoxication, having lithæmia at one end in its primary stage and uric acid at the other in its final one. I am firmly convinced that this metabolic defect is not confined to one function or one system, and I shall take up the various systems in the order of their importance.

The Nervous System.

The influence of the nervous system in the production of gout has been invoked by every writer on the subject since the time of Sydenham. Sir Dyce Duckworth regards the disease as a neurosis which descends as an hereditary legacy from progenitors. Given the same conditions in two individuals disposed to form uric acid in excess, the one with a strongly inherited neurotic tendency will develop gout and the other will not. This instability of the nervous system is not confined to those who inherit the gouty tendency, for those who acquire it by dietetic over-indulgence possess a nervous system that is, to use a popular expression, "easily upset"; they are of an anxious and sensitive disposition, choleric, and irritable, with a tendency to perspire and become flushed from slight causes as well as to other symptoms indicative of their vaso-motor equilibrium being easily deranged. In fact, the gouty individual possesses a vulnerable nervous system which betrays its weakness in the higher centres as well as the vaso-motor and trophic ones; and this altered metabolism on the part of the nervous system produces an increase in the blood of morbid material out of which uric acid is formed. Gouty attacks are well known to be excited by mental conditions affecting the predisposed, such as excessive brain work, anxiety, and loss of sleep.

The Digestive System.

In the acquired form of gout the digestive system plays the rôle of chief factor and, according to Dr. Haig, the only one in the production of uric-acid-æmia. We have to thank

¹ A paper read before the Medical Section of the Royal Academy of Medicine in Ireland on March 20th, 1896.