I would ask: Is knowledge likely to be advanced, is any useful purpose to be served by continuing a discussion upon such grounds? In my *Epicriticism* I dealt with every point that had been advanced against my work, and I showed that its validity remained unaffected. In Dr. Paton's further criticism, whilst much that I have said is allowed to pass unnoticed, certain points are taken up and dealt with again. Neither in his first nor in his second criticism is any attempt made to enter into the question of the soundness of the material which he draws from published literature. I affirm with regard to the second, as I did with regard to the first, that in no respect is the validity of my work shaken.

I have given illustrations of the kind of material to be found in Dr. Paton's reply to my *Epicriticism*, and I consider they render it unnecessary that I should deal *seriatim* with the several points raised. The matter has been sufficiently set forth to be placed in a position to be judged by others, and judgment will with the advance of time inevitably be passed upon it. Science in this department will not stand still any more than in any other, and I for my part am quite ready to leave the matter to the future to decide, and I do so without misgiving as to the result.

It happens, fortunately, that the necessity for prolonging the discussion of collateral points no longer exists in view of what has been admitted by Dr. Paton to constitute the essential point in the question at issue. He says:

The great and central question at issue in Dr. Pavy's work is this: Is there during life a constant production of glucose in the liver? It is upon this point that his theory must stand or fall. If the evidence here is against him, and if he fails to prove that the liver is simply a sugar-stopping and not also a sugar-producing organ, his "system of knowledge" (p. 135) must collapse.—*Edinburgh Medical Journal*, February, 1896, p. 726.

I accept this presentation of the position, and the ground of contention thus becomes narrowed within well defined limits. The question, indeed, may be said to resolve itself into the following simple issue: Can sugar be poured into the general circulation, as is implied by the glycogenic doctrine, without leading to a corresponding appearance of sugar in the urine, which means diabetes? To this, in a decided manner, I say No.

(To be continued.)

THE HYPODERMIC USE OF GUAIACOL IN ACUTE PULMONARY TUBERCULOSIS.¹

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THE more recent and now very general employment of creasote, and more especially its principal constituent guaiacol, in the treatment of pulmonary tuberculosis is another curious instance of therapeutic vicissitude. Creasote was used in phthisis on the Continent quite sixty years ago, but probably owing to crudeness of preparation and insufficient dosage, it gradually fell into disrepute until, restored to favour on the recommendation mainly of Professor Sommerbrodt,² Drs. Paul Guttman³ and Oscar Frantzel⁴ in Germany, and of Bouchard,⁵ Gimbert,⁶ Rodais,⁶ and Bonnefontaine⁷ in France, the last of whom pointed out the greater purity and more agreeable qualities of the creasote distilled from beechwood. In 1877⁸ I published my first paper, describing its efficacy in diminishing the heavy purulent expectoration in phthisical and other lung affections, when used for inhalation, by means of an adaptation of the ordinary respirator. I suggested that it acted as a direct antiseptic on the germs to which the pus formation was due. Latterly, the use of creasote, both internally and by inhalation, has been largely superseded by guaiacol, to which attention was drawn more particularly by Sahli⁹ and afterwards by

Horner.¹⁰ Guaiacol is separated from creasote, a highly complex body, by distillation. It forms from 70 to 90 per cent. of creasote, together with varying proportions of its homologue creosol, the isomeric creosols and phenol, according to the purity of the latter. It is probably the therapeutically active as well as the principal constituent of creasote.

My chief object in this paper, however, is to direct attention more especially to the great value of guaiacol used hypodermically in the treatment of acute pulmonary tuberculosis. Both creasote and guaiacol alone, and combined with iodoform, have been used hypodermically in oily and other sterilised solutions by Gimbert,¹¹ Picot,¹² and Léon Rosenbusch,¹³ the latter of whom injected every three or four days a 3 per cent. solution of guaiacol in sterilised almond oil into the parenchyma of the lung, either through the second intercostal space or the supraspinous fossa. Such preparations are, however, uncleanly, bulky, awkward to manipulate, and comparatively painful. They involve elaborate preparation and great expenditure of time.

It was Dr. Arnold Schetelig,¹⁴ of Nervi, who first showed that a vehicle was quite unnecessary by injecting pure guaiacol in a case of acute advanced pulmonary tuberculosis, which at the moment was in the gravest condition, and which I had subsequently the opportunity of examining during convalescence in this country. The very day—May 5th, 1889—I received Dr. Schetelig's report describing the remarkable results in this case, I happened to have under my care a patient with pneumonic phthisis affecting both bases in a most critical condition. There was extreme prostration, with a nocturnal rise of temperature to 103.8°, which no treatment had been able to affect. Three hypodermic doses of πxv , πx , and πx of pure guaiacol at intervals of four hours brought the temperature down to normal, with rapid amelioration of all the symptoms, followed by complete and permanent recovery.

My subsequent experience in a large number of cases has been very encouraging. I do not, however, for obvious reasons advocate this therapeutic proceeding indiscriminately in every case of pulmonary tuberculosis, without reference to the stage of the disease or consideration of other remedial measures previously exploited or still thought necessary. For instance, if the range of temperature is not extreme, and the other conditions not urgent, it is better to try the effect of guaiacol administered in the usual way by the mouth, either in capsule or dissolved in cod-liver oil. A dose of πv three times a day even may suffice to reduce the temperature, but, on the other hand, it may be necessary to intensify the treatment by raising the dose πv at a time until πxl or even more has been reached. The favourable effect of this exhibition of the remedy *per os* is well illustrated by Chart No. 1 of M. McN., admitted April 1st, 1894.

CASE 1.—This is a case of acute tuberculosis with excavation at both apices, with rapid loss of flesh—9 lbs. the last twenty days—much cough, and heavy nummular purulent expectoration, temperature ranging at night from 100° to 102.4° unaffected by the salicylates and other antipyretics. Under πv of guaiacol in cod-liver oil, commenced May 2nd, the temperature fell steadily to normal, and she left the hospital on July 10th with her disease practically arrested; as stated in the hospital casebook, "no expectoration, very little cough, having gained 13½ lbs." On June 6th, 1895, a letter was received from her uncle, saying: "The late patient now weighs a little over 10 st., and is perfectly well."

In order to understand the indications for employing our remedies in the pyrexia of phthisis, it is necessary we should as far as possible determine the pathological conditions from which they arise. In the light of recent progress in our knowledge of its pathogeny, pulmonary tuberculosis may be defined as an acute infectious disease of bacillary origin, determined by hereditary or acquired proclivity, tending to chronicity, with occasional arrest more or less permanent, and to progressive retrograde changes in the lungs, the seat of characteristic lesion. Regarded thus, we obtain a precision and directness in our therapeutic methods much desiderated, and which permit our basing a rational therapeutics on a sound pathology.

The pyrexia of pulmonary tuberculosis presents two phases, related and consecutive. The first—the primary or initial

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

²Berl. med. Woch., No. 43, 1878, and Therap. Monatschr., July, 1889.

³Zeitschr. für klin. Med., vol. xxii, p. 488.

⁴Berl. klin. Woch., Nos. 8 and 23.

⁵Gazette Hebdomaire, Nos. 31 and 33, 1887.

⁶Union Médicale, No. 66, 1879.

⁷Union Médicale, March 11th, 1879.

⁸Lancet, October 5th, 1877.

⁹Korrespondenzblatt für Schweizer Aerzte, No. 20, 1887.

¹⁰Prager med. Woch., No. 17, 1888.

¹¹Gazette Médicale de Paris, August 8th, 1883.

¹²Bulletin de l'Académie, No. 9, 1890.

¹³Wiener med. Presse, Nos. 24-26, 1888.

¹⁴Deutsche medizin. Zeitung, February 2nd, 1893.

stage—corresponds to the period of bacillary infection. It is subpyrexic in type, the daily thermometric range seldom exceeding 3°, and rarely falling below normal in the morning, there being usually imperfect resolution by night sweats. Unfortunately, cases in this stage are not so often brought under the notice of the physician; and it is probable, judging

by *post-mortem* evidence, that a large number of cases, even when still more advanced, escape observation altogether, and undergo spontaneous resolution. This primary stage is much more amenable to treatment than that into which it usually passes—the second or septic stage. This is of the hectic or suppurative type of fever, probably complex in nature, result-

Chart 5

Chart 6.

Chart 7.

ing from the combined toxins of the tubercle bacilli' and of the bacteria concerned in secondary necrotic and suppurative processes initiated by, and derived from, the primary infection.

It is the treatment of this suppurative stage of tuberculous pyrexia that taxes to the utmost the therapeutic resources of the physician. As the duration and intensity of this stage determines the extent of lung substance involved, and the degree of disintegration attained, its control and arrest constitute a question of primary importance. It must be borne in mind that we have to deal with a febrile movement of the most adynamic type, in a constitutional state tending to rapid retrograde organic changes. Therefore all depressing and so-called antiphlogistic treatment, such as diaphoretics generally—antimony, aconite, acetate of ammonia, ipecacuanha, and the like, are entirely inadmissible. Even the antipyretics of the coal tar series—antipyrin, antifebrin, phenacetin, phenocol, salicylic acid and its salts, must all be used with caution. It is important to note that the last-named class of remedies that have proved so efficacious as antipyretics are essentially antiseptics. This

would almost justify the assumption that their action cannot be on the so-called "heat-regulating centre," but rather on a local heat-producing process in the tissues themselves, - analogous, perhaps, to that which raises the temperature in vegetable fermentation. These substances must act, therefore, by neutralising the pyrogenic influence of the toxic or septic materials evolved, directly or indirectly, by the bacillary infective process, and are also at the same time, in varying degrees, directly destructive to the microbes themselves.

In the treatment of this suppurative phase of tuberculous pyrexia, we have often to ring the changes on a variety of drugs, in addition to other auxiliary but scarcely less necessary remedial measures. In this stage of acute phthisis, more perhaps than in any other disease, there is demanded a great variety of weapons in our therapeutic armoury. Hardly any two cases respond alike to the same remedies, and rarely indeed is it not found necessary to change, modify, and adapt them in the same patient. There is, indeed, no routine treatment for such cases.

In cases in which the range of temperature does not indi

cate high intensity, as I have already said, I endeavour to ascertain whether guaiacol in capsule or in cod-liver oil, in doses of $\text{m}\nu$ to $\text{m}\chi$ three times a day will not suffice to reduce it; failing in this, I usually next put my trust in $\text{gr}\cdot\text{x}$ to $\text{gr}\cdot\text{xv}$ of salicylate of soda, with 3j of tinct. cinchon., in half an ounce of infusion of yellow cinchona every three or four hours. If the salicylate depresses, I substitute $\text{gr}\cdot\text{xx}$ to $\text{gr}\cdot\text{xxv}$ of salicine (dissolved with the aid of two or three drops of dilute hydrochloric acid to the ounce) in 3j of compound tincture of cinchona. When this does not succeed, I give $\text{gr}\cdot\text{v}$ to $\text{gr}\cdot\text{vijs}$ of anti-febrin, or of hydrochlorate of phenocol, every three hours, when the temperature is above normal; and each time it falls below, $\text{gr}\cdot\text{v}$ to $\text{gr}\cdot\text{x}$ of sulphate of quinine. It is to be remembered in this connection that quinine acts not so much as an antipyretic but as an antiperiodic, and as such tends to maintain the thermic equilibrium by preventing the febrile reaction liable to follow the sudden drop of temperature to subnormal under the influence of the antipyretic. But in many cases, particularly when the disease is advanced, these several drugs, however associated with other general medication, fail, and then the hypodermic administration of guaiacol is indicated.

The following cases, which I now submit for your examination, have been copied from the casebooks of the Royal National Hospital by Dr. Cyril Lewis, Senior Resident Physician, from a large number similarly treated; the charts numbered to correspond with the cases, to save space, give only the maximum daily temperature:—

CASE II.—J. B., country policeman, aged 36; admitted December 20th, 1894. Pulmonary tuberculosis, third stage (excavation) right apex; second stage (softening) left apex. Much cough. Heavy yellow nummular expectoration, amounting sometimes to 3x in twenty-four hours. Heart sounds weak; urine albuminous; œdema of feet and ankles; pyrexia; "general condition grave." Height, 6 ft.; weight, 9 st. 11 lbs. 12 ozs. Patient lost ground steadily under treatment, his weight falling to 9 st. 9 lbs.; the evening temperature reached 102° . Guaiacol inoculations, beginning with mij , was commenced January 10th, and continued until April 26th with brief intervals, the highest dose given being mvi . The temperature being practically normal, he was put on May 3rd upon guaiacol mx in 3iv of morrhua ter in die until the patient's discharge on July 2nd. He then weighed 10 st. 9 lbs. 8 oz. The expectoration had entirely ceased, and with it the cough. All the objective symptoms had disappeared, and the physical signs indicated complete arrest of the disease.

CASE III.—G. R., aged 21, clerk; admitted November 26th, 1894. Pulmonary tuberculosis, third stage, left apex; second stage, right apex. Systolic *bruit* in tricuspid area; voice feeble, breath short, much cough, but expectoration scanty, great weakness, night sweats, great and rapid loss of weight; the evening temperature reaching 102° in spite of treatment. Guaiacol inoculation, commencing with mij and increased gradually to mvi , was begun on December 26th. The temperature soon fell to a normal range, but the inoculations were continued to February 13th, 1895. The whole condition and symptoms were greatly improved, there being a gain of 5 lbs. in weight.

CASE IV.—M. B., aged 28, nursemaid, admitted March 25th, 1895. Pulmonary tuberculosis, third stage (small vomica), left apex, second stage (early), right apex. Much weakness, and frequent and severe diarrhoea; cough, expectoration, dyspnoea, night sweats, pain in left apex, and great loss of flesh. The evening temperature on admission registered $100^{\circ}\cdot 2$, but notwithstanding various treatment, the salicylate of soda causing great depression, the temperature ultimately reached $103^{\circ}\cdot 2$. On April 5th guaiacol inoculation was commenced in mij doses, and continued in doses varying from mij to mx , sometimes the dose being divided and given night and morning according to the thermometric indications, until the 30th, when the temperature fell practically to normal. The temperature rose to $104^{\circ}\cdot 4$ on April 16th, when the above section of the chart begins. The patient was discharged on July 3rd with the disease arrested.

CASE V.—M. W., aged 21, housemaid, admitted March 29th, 1895. Pulmonary tuberculosis, third stage left apex, first stage right apex, the left lung showing symptoms of extending softening with pleuritic frémits over base of lung in front. Improved steadily until May 8th, when with development of active mischief in left lung the midday temperature rose to $101^{\circ}\cdot 2$, evening $10^{\circ}\cdot 2$. The chart records the subsequent range. Guaiacol was commenced hypodermically May 20th in mij doses gradually increased to mx . Patient steadily improved until discharged July 17th. The vomica was quite dry, very few small crepitations over base of left lung in front, no cough or expectoration. Says she "feels very much better and stronger."

CASE VI.—J. S., aged 30, admitted March 12th, 1895. Pulmonary tuberculosis; third stage both apices; vocal cords, especially the left, very congested, and margins ulcerated; faint systolic *bruit* in both aortic and tricuspid areas; complaints of cough, expectoration, night sweats, dyspnoea, rapid loss of flesh during the last two months; phonation slightly impaired, with feeling of swelling and "stiffness" in the throat, and frequent desire to swallow. Guaiacol was administered hypodermically on March 20th in miv , increased to $\text{m}\nu$ on March 26th; on March 28th the patient weighed 9 st. 5 lbs. 12 oz., and on April 15th he weighed 9 st. 9 lb. The guaiacol inoculations were stopped on April 15th, the patient having made marked progress in every respect.

CASE VII.—W. S., aged 24, hairdresser, admitted September 26th, 1894. Pulmonary tuberculosis; second stage both lungs; moist crepitations and friction very marked at right base posteriorly; disease acute and pro-

gressive; prognosis unfavourable; complains of great weakness, cough and loss of flesh; weight, 8 st. 3 lbs. 8 oz. The temperature attained 102° on September 20th, and, as it did not yield to other remedies, guaiacol injections (mij) were begun on October 22nd. This was continued, although on October 31st the temperature reached $104^{\circ}\cdot 2$, the dose being gradually increased to $\text{m}\nu$ until November 16th, when the temperature was permanently reduced to a normal range. The patient was discharged on January 2nd, 1895, "very much improved," with the disease arrested, weighing 10 st. 5 lbs. 12 oz., a gain of 2 st. 2 lbs. 4 oz.

These cases had all been previously treated by the several internal remedies on the principles just described, but without any favourable effect on the pyrexia or other symptoms. The comparatively small dose necessary to employ in this form of medication is noteworthy.

In many of the cases in which the treatment was carried out the injections were persevered in for some time before any impression was produced on the temperature. It will be observed that the fall of temperature is comparatively gradual, and very rarely falls to subnormal. This valuable property of guaiacol, which especially distinguishes it, was first observed by Dr. Schetelig.¹⁵ In correspondence with the falling temperature improvement almost invariably takes place in the other symptoms, especially marked in diminished cough and expectoration and increased appetite and weight. A moderate warm perspiration, which usually follows the injection at a variable interval, very soon takes the place of the regular hectic night sweats. I have usually continued the exhibition of the remedy by the mouth at the same time, not only to aid in the saturation and probable sterilisation of the blood, but because pure guaiacol seems to check the decomposition of food in the *primæ viæ*, which the notoriously enfeebled digestion of phthisical patients so readily permits. As I have already said, it is only in comparatively rare cases that guaiacol given by the mouth, even in the largest and frequently-repeated doses, influences the temperature of acute pulmonary tuberculosis when of high intensity, whereas a daily inoculation of from mij to $\text{m}\nu$ in a very large proportion of cases reduces it gradually and permanently.

As regards dose and mode of hypodermic administration, I usually begin with the minimum-dose, giving it before the diurnal rise of temperature has passed above normal. If the temperature is not reduced in a few days the dose is increased drop by drop to $\text{m}\nu$ or even mvi , which rarely requires to be exceeded. If the reactive sweating is excessive it may be necessary to give two small injections daily, but this is quite exceptional; latterly, at the same time I have used guaiacol epidermically, instead of a second injection, to anticipate the evening rise of temperature, painting from mx to mxxx over the cutaneous area corresponding to the pulmonary lesion. Some patients are extremely sensitive to this mode of using the remedy, being more affected by it than the other methods. In this, as in using Koch's tuberculin, each case must be closely observed and treated on its individual indications. In a number of cases where there was much cough, and where the strumous cachexia was pronounced, I have used hypodermically a 5 to 10 per cent. solution of iodoform in the guaiacol, and I have also used the same formula in capsules, but I was unable to observe any more favourable results than with the plain guaiacol. In these solutions the iodoform readily undergoes decomposition under the influence of light, free iodine being liberated.

There is no doubt many patients object to the hypodermic treatment on account of the slight amount of pain, and that it also involves some little trouble to the nurse or attendant by whom the injection is made; and, trifling as these objections are, it must be confessed that they assert themselves, and prevent a wider use of this form of medication than is otherwise desirable. When the needle is sharp, and inserted deeply into the subcutaneous tissue at right angles to the surface, there is very little more pain, and that very evanescent, than with any other of the remedies usually thus employed. It is the bulk more than the nature of the material that produces the pain in hypodermic injection. The buttock is much the most favourable region for the purpose. Small areas of the skin have occasionally sloughed where the guaiacol was improperly injected just under it so as to cut off the blood supply, and alarming collapse, especially on one classical occasion, has, I believe occurred: but I am certain they have resulted either

¹⁵ Deutsche medicin. Zeitung, February 20th, 1889.

from the impurity of the drug employed, or from its having been injected directly into a vein. Very much purer guaiacol is now supplied, and if the buttock is selected no vein will be encountered of sufficient calibre. In many hundreds of inoculations I have very rarely met with any *contretemps* whatever, and then only of slight moment. In a case of long-standing and extensive lupus erythematoses, in which an intensive treatment was recommended, I injected guaiacol daily in doses rapidly increased from $\text{m}\nu$ to mxl for a period of eight months with a single week's interval, and only on two occasions, after the largest dose was reached, was there any intolerance exhibited, and that only in the form of dyspnoea, which quickly passed away.

One important circumstance must be noted—namely, that in every case, sooner or later, in which guaiacol is used hypodermically it is distinctly tasted by the patient a very few minutes after inoculation, and this lasts a considerable time. This conclusively shows that the system can in this manner be readily saturated with the unaltered drug. This is a point of some significance in relation to the mode in which it may be supposed to act on the morbid conditions present. However long guaiacol is taken by the mouth, and in whatever quantity, it very rarely thus declares its unchanged presence in the blood, and this, indeed, may be reasonably accepted as the explanation of its different effects when used hypodermically and when otherwise administered.

The observations recorded in the series of cases I have submitted justify, I believe, the conclusion that in small doses, administered subcutaneously, guaiacol by itself succeeds frequently in reducing the temperature and relieving the objective symptoms satisfactorily and often permanently in acute pulmonary tuberculosis when it and other accredited antipyretics have failed when exhibited by the mouth. This marked difference in effect may be due to changes effected in the nature and properties of the drug during the digestive process. The fact is that guaiacol is of extremely unstable organic constitution, and its true chemical composition has probably not yet been satisfactorily determined.

Professor Attfeld, referring to some specimens of the drug submitted to him for examination, says: "The article is identical with the 'guaiacol' which made the reputation of 'guaiacol'..... But this 'guaiacol' is passing through a phase resembling that of pepsin. Nobody yet knows what real pepsin—pepsin and nothing but pepsin—is..... We are somewhat more advanced in knowledge as regards guaiacol. The fluid, known hitherto as guaiacol, is probably more than nine-tenths a single definite substance. In fact, quite recently, this substance has been isolated, and, when thus freed, it is probably a solid. This is probably real guaiacol. It is not yet in commerce." In a subsequent letter Professor Attfeld says: "Guaiacol in constitution in the methyl-ether of a diatomic phenol— $\text{C}_6\text{H}_4(\text{O. H.})(\text{O. CH}_3)$."

Be this as it may, we find this guaiacol, when injected subcutaneously, acting in smaller doses much more potently on certain morbid phenomena than when otherwise administered, and all clinical evidence tends to the opinion that this is probably accomplished by a double action, partly bactericidal as well as antiseptic—on the infective microbes themselves as well as on their septic products. The experiments of Cornet and of Bouchard go far to confirm this view. It is evident that the accumulation of free guaiacol in the system must be the most efficient mode of attaining this purpose. Dr. Guttman, and subsequently Professor Rosenthal, from independent experiments in sterilising cultivations of Koch's tubercle bacilli, concluded that saturation of the blood of an average adult man to the extent of $\frac{1}{1000}$, ought to suffice to sterilise it also. Estimating the weight of the blood mass at 8 lbs., it would only be necessary to introduce 1 gramme or mxv of guaiacol into the circulation for this purpose. Dr. Schetelig, however, in his first paper, above referred to, pointed out that we must widely extend these figures if we seek to sterilise to any approximately satisfactory degree the entire system, for to affect the blood alone would not suffice, "as we should consider all the fluids of our system as the cultivating soil, seeing that the microbe grows in all tissues." He thinks we should take the bulk of the whole amount of the fluids of the body, and estimating this at 60 per cent. of an individual 120 lbs. in weight, this would be equal to 72 lbs., and would consequently require in the same

ratio 9 g. or 135 grs. of guaiacol for anything like satisfactory sterilising purposes. Clinically, however, we have proof that by subcutaneous administration of comparatively small doses free guaiacol accumulates and circulates in the blood in such quantities as to be distinctly recognised in such secretions as the saliva and the urine, the latter being its constant vehicle of elimination.¹⁶ That it is not so frequently thus recognised when exhibited by the mouth shows that it must either pass unchanged through the *primæ viæ*, or become partly at least transformed into substances less therapeutically active. This tolerance of free guaiacol in the body constitutes its most valuable property as compared with all other cognate antiseptics. This tolerance of the tissues generally for guaiacol is, indeed, quite remarkable. I have repeatedly injected through the chest wall 3iv to 3vj of a 10 per cent. solution of guaiacol in paraleine into both vomicae and bronchiectases without any inconvenience to the patient. I have also used similar solutions intratracheally, but the results have not been sufficiently encouraging to warrant their continuance.

It must be admitted, when we come to consider the action of a remedy in a case of pulmonary tuberculosis, and endeavour to trace the connection between the results, as seen in the improved condition of the patient, and their probable cause, that it must necessarily be, to a large extent, a matter of inference, especially as the essential lesions are not directly cognisable. I have had, however, the opportunity of observing the curative action of guaiacol in several cases where the tuberculous process was visible. In one case, which was seen among others by Dr. Saundby, of Birmingham, who pronounced it unique, there was ulceration of the soft palate, fauces, uvula, tonsils, and upper part of pharynx, the discharge from which was swarming with bacilli; the curative effect of the direct application of guaiacol was quite striking after a variety of other appropriate applications had failed. In another case, that of a young lady of markedly strumous constitution, who had been infected by a brother with a large vomica at each apex, whom she had assiduously nursed for nearly two years, the ulceration affected at first the mucous membrane of the left side of the mouth, where its nature was not recognised until it extended to the corresponding side of tongue, tonsil, and epiglottis, becoming continuous and deeper, and ultimately involving the apex of the lung of the same side. The condition went on from bad to worse, until I began the local application of guaiacol iodoform (5 per cent.), the same being taken internally in capsules. A complete and permanent cure has resulted, and no physical signs remain in the chest. In many cases of tuberculous laryngitis I have used guaiacol with good results, but latterly I have found iodoform or lactic acid altogether more satisfactory.

I may be permitted to conclude this paper by merely referring to two compounds of guaiacol—the carbonate of guaiacol and benzoyl guaiacol—that have been recently introduced with great expectations. I have tried them both, but have not been able to satisfy myself that they have any special claims to therapeutic preference. The carbonate of guaiacol is a powder, whereas the carbonate of creasote is an oily, dark-coloured liquid. This shows very material chemical discrepancy in their constitution.

MEMORANDA: MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, Etc.

HÆMOGLOBINURIA IN MALARIA.

HAVING read Dr. Patrick Manson's very able lecture on Benign and Pernicious Malarial Fevers, I notice two points on which a relation of my personal experience may throw some light.

Hæmoglobinuric would appear to be a very dangerous form of malarial fever in Dr. Manson's experience, and I further notice that he does not think that the same parasite which causes benign quartan or tertian fever is responsible for the

¹⁶ Drouke (*Berlin. med. Woch.*, January 26th, 1891) declared its elimination in the form of an aromatic sulphuric acid. Gaillard (*Bull. de Thérap.*, May 30th, 1892, p. 447) showed most of the injected quantity passed through the kidneys in the first twelve hours.