it is not an absolutely certain antipyretic, but it is commonly of decided advantage if persevered with in reducing the fever, and by so doing in diminishing the activity of the disease.

3. That even where it fails within a reasonable time to modify the fever, it is still serviceable in most cases in diminishing expectoration and in modifying the cough.

4. Though it is serviceable in limiting waste by reducing temperature and by diminishing expectoration, it cannot be said that this treatment is specially favourable to increase in body weight.

5. The treatment is without risk with ordinary precaution.

6. Its use does not prevent the development of other tuberculous outbreaks or extensions of tuberculous mischief, for tuberculous meningitis, pleurisy, hæmoptysis, pneumothorax have been shown to occur after many injections.

7. In interpreting the mode of action of these remedies, their antiparasitic action should not exclusively be thought of. It should not be forgotten that both remedies act, even in small doses, upon the patient himself; that so long ago as 1867 Headland, in his *Action of Medicines*, described creasote as a sedative, a stimulant of mucous membranes, and as a true astringent.

ON THE USE OF DOG'S SERUM IN THE TREATMENT OF TUBERCULOSIS.

Read in the Section of Therapeutics at the Annual Meeting of the British Medical Association held in Bournemouth, July, 1891.

By C. BERETTA, M.D.,
Paris.

In his most interesting address to the general meeting Dr. Lauder Brunton called the attention of the Association to the use of the serum of dog's blood, recently inaugurated in France by Professor Charles Richet. I propose to give a short explanation of this method of treatment, and a rapid sketch of the original experiments made upon animals, the way to procure the serum, the mode of using it, and the results obtained.

It is well known that the staphylococcus pyosepticus causes fatal septicæmia when injected into a rabbit, and only local suppuration when injected into a dog. Professor Richet and Dr. Héricourt, as far back as 1888, succeeded, by injecting a small quantity of dog's blood into the peritoneal cavity of a rabbit, in rendering this animal also refractory to the action of the same microbe. They noticed besides that the experimental immunity of the rabbit was still more marked when the injected blood belonged to a dog which had previously been inoculated with the staphylococcus. It was natural that the same method should be tried with other microbes, particularly with the bacillus of tuberculosis to which the rabbit is so liable, while the dog is manifestly refractory to it. The principal results successively announced by MM. Richet and Héricourt to the French Academy of Sciences and to the Paris Society of Biology may be summarised as follows:

First, a rabbit having been inoculated with a culture of the tubercle bacillus, the evolution of tuberculosis can be arrested by injecting dog's blood afterwards when the bacillus culture is not too virulent, but this evolution is only delayed when the culture is very virulent.

Secondly, the effective substances of the blood, which have not yet been identified, reside in the serum, and a small dose of the latter is sufficient ($\frac{1}{3}$ cubic centimetre per kilogramme of the rabbit).

Thirdly, the serum of dog's blood has a prophylactic action—that is to say, when injected into a healthy rabbit it prevents the development of experimental tuberculosis at a later period.

Fourthly, the serum of a dog which has been previously inoculated with tuberculosis seems to be more efficacious in a healthy rabbit, but, on the contrary, seems to aggravate the disease when injected into a rabbit already tuberculated.

These results encouraged several physicians to try the dog's serum, called also hæmocyste, upon human beings, of course, with all requisite precautions.

We had the gratification of showing in Paris to Dr. Lauder Brunton and to other members of this Association the process we use in Professor Richet's laboratory. The blood is taken aseptically from the carotid artery of a strong, healthy dog, and is received in sterilised receptacles closed with cotton wool. The serum quickly separates itself, and can the next day be drawn by suction into glass pipettes also sterilised, which are immediately shut at both ends by means of a gas burner. In this way are obtained flasks of this very convenient form filled with pure, clear, transparent serum more or less coloured by hæmoglobin. It must be employed as unaltered and as fresh as possible. Of course a careful necropsy is made of the dog; its blood is microscopically examined, and no serum is used for man, except from animals in a perfect physiological state of health. It is interesting to notice that we have now made hundreds of necropsies of dogs of all kinds without finding a single case of spontaneous tuberculosis in this animal. The serum has sometimes been given by the mouth, but, of course, its effects are much more marked when injected. Injections of one or more cubic centimetres are generally made every two days in the subcutaneous cellular tissue of limbs or trunk. They must be performed with strict aseptic precautions and with sterilised syringes. In this manner several thousands of hæmocyste injections have already been given without any serious accident. The temperature of the patient is as a rule only slightly increased after each injection of serum. It should, however, be mentioned that very often a peculiar local swelling does appear at the site of injection, which is accompanied by redness, sometimes pain, and even short fever, but never by suppuration. A more or less widespread urticarial eruption, probably of a similar nature to the nettle rash produced in some people by mussels, crustacea, or certain kind of drugs, is also common. I hasten to add that these phenomena are neither dangerous nor lasting. We have not yet been able to establish any relation between their appearance and the action of the serum.

I come now to the results obtained by using dog's serum, principally against tuberculous diseases. I shall not trouble you with the details of the numerous cases, both medical and surgical, observed in France by Drs. Héricourt, Langlois, St. Hilaire, Clado, Morel-Lavalée, Feulard, Laborie, Wehlin, etc., nor even with those I have myself followed at the Paris Hôtel Dieu, in Professor Verneuil's department. I need only describe the clinical phenomena usually noticed by different observers. In the first place, it must be acknowledged that in about one-third of the cases no apparent result was obtained. In the other two-thirds a real improvement, more or less marked, has been observed.

In all these cases it was remarkable to see how quickly the patient recovered his appetite, strength and power of movement, while his weight gradually increased. As a rule, after a few injections, the patient sleeps better, the digestive functions become more regular; in some cases we find that coughing, expectoration, sweating, and hæmoptysis, are diminished. Twice it was noticed in young women that long suppressed menstruation came on again. Lastly, in a number of cases, there has been a local improvement of the anatomical changes in the lungs, the larynx, the skin, bones, suppuration, etc. The favourable modifications were well maintained in several patients. These patients were in the first stage, or at most in the beginning of the second stage of the tuberculous evolution. Unfortunately, in most of the other cases the wonderful effects of the first days were not durable, and the tuberculous evolution has only been delayed for a few months.

To sum up: dog's serum, in men as in animals, does not seem to have a special curative action against tuberculosis, but it possesses a powerful action, if not against the microbe, at least against its effects. It seems to act as a powerful tonic, and indirectly by improving the general nutrition puts the patient in a better condition to overcome his terrible disease. The blood of steers, tried by MM. Bertin and Pique, the serum of sheep, tried by Professor Lépine, seems to give similar results.

Experiments upon animals' blood are very much *à la mode* now on the Continent, and I am very happy to see here present Professor Mosso, from Turin, who made such interesting experiments upon the blood of eels and other

animals. In view of its valuable effects upon nutrition, dog's serum has also been used, and with the same success, against other cachexias produced by syphilis (cases of Professor Fournier), chronic malaria (a most remarkable case of Dr. Clado's), anemia, etc. At last Professor Pinard, by injecting dog's serum, has succeeded in saving a number of newborn children, the offspring of consumptive women. I spoke just now of the good done by serum to tuberculous patients. You know how important it is to feed them.

To conclude: it is to be hoped that these encouraging clinical experiments on the effects of serum will be continued by physicians. Professor Richet, Dr. Héricourt, and myself will be very pleased to give any details that may be desired, and to show in Paris the process we use in the Physiological Laboratory of the Faculty of Medicine.

SECTION OF THERAPEUTICS.

WILLIAM VICARY SNOW, M.D., President.

DISCUSSION ON KOCH'S TREATMENT OF CONSUMPTION.

THE PRESIDENT having given the address, which was printed in the *BRITISH MEDICAL JOURNAL* on August 1st, p. 256, Dr. SINCLAIR COGHILL made the observations and exhibited the sphygmograms which are reproduced at pages 1037-8.—Sir WALTER FOSTER congratulated the President on the very reasonable tone of his address and the interesting cases he had brought forward. He himself felt that the Koch mania which prevailed last year was one of the most humiliating incidents in the modern history of medicine. The public had naturally gone wild at the near prospect of a cure for the great scourge of humanity, but the profession had been too easily carried away by the prevailing excitement. This was very regrettable, as in the sequel it lessened public confidence in medical judgment. The publicity given by the press to Koch's discovery had made calm and deliberate investigation almost impossible. For a fair and just examination it was necessary that the remedy should be first tested by skilled workers in hospital practice. He had tried to get this done, but without success. The merit of the cases brought before the Section was that they were so studied. But even in these cases the results were not superior to many obtained without the injection treatment. In the address on medicine last year he had pointed out that the line of research adopted by Koch was likely to be the most fruitful in the future. In his observation of the injection treatment he had seen much to support Dr. Coghill's view of tuberculin being a nutritional stimulant. There was caused, no doubt, a great nutritional movement in the diseased parts. It was possible, he thought, that this altered nutrition made the tissues healthy enough to get rid of the bacillus. There could be no doubt that certain conditions of soil were necessary for the growth of bacilli. As some seed from the hand of the sower fell on stony places and died, and other seed fell on good soil and brought forth many fold, so he thought it was in the human organism. These bases of altered nutrition suitable for the development of these minute organisms must be searched out in order to prevent such diseases as tuberculosis. In conclusion, he pointed out that the pulse tracings, shown by Dr. Coghill, illustrated admirably the effect of tuberculin on the pulse. They showed, however, another most important point, namely, that in subsequent injections the pulse did not become so rapid, although the temperature rose even higher. This was due to the effect of the tuberculin in increasing the vascular tone, slowing the pulse, and increasing the signs of vascular tension.—Dr. MARKHAM SKERRITT made the communication which is published at page 1038.—Dr. J. K. FOWLER referred briefly to his experience in the use of this remedy at the Brompton Hospital, which was unfavourable. In one case, in a youth, of infiltration of both apices and one lower lobe, previously afebrile, the remedy appeared to light up the tuberculous process with great intensity; in other cases he had not observed any favourable changes in the general or local conditions. He referred to a case under his care in which a fibrous capsule enclosing a calcareous mass had been expectorated, and subsequently six other calcareous masses within a comparatively short period as showing the possibility of disturbing lesions which were quiescent or in arrest. He thought that a much

longer experience in the laboratory was required before this or any similar remedy was placed in the hands of the profession.—Mr. WILLIAM ODELL (Torquay) stated that he had ten cases under treatment—seven cases of phthisis pure and simple, one of lupus, one of joint affection, and one of pulmonary tuberculosis with joint affection, and he could report favourably of seven of them. He believed that much of the injurious effect of the remedy was due to its too frequent use, and the administration of too large doses. He instanced three or four of the cases in which there was apparently no doubt of a permanent good result, and stated that he believed climatic influences had much to do in aiding or retarding the treatment.—Dr. E. HAUGHTON (Upper Norwood) was struck with Mr. Odell's cases, which were remarkable though by no means convincing, since he spoke of a case in which the last injection of Koch's fluid was made within a week as a cure. The cases exhibited by Mr. Jonathan Hutchinson to the profession and the cases under Sir Morell Mackenzie (which he had carefully watched) did not point to any real value in Koch's treatment. There was also the question of danger, which must be very great before three capital cities in Europe would have publicly forbidden its use. As, under favourable conditions, improvement was obtainable for phthisical cases by ordinary treatment, it must not be assumed that the improvement under Koch's treatment was necessarily to be attributed to its use. The avidity with which the profession had received the so-called "remedy" did not indicate the "judicial mind" which was needful in the case of a virus capable of producing alarming symptoms in a very large proportion of cases, and which had been attended by relapse in a number of cases in which a cure was publicly announced.—Dr. BRADBURY said that the results of Koch's treatment at Addenbrooke's Hospital, Cambridge, were unsatisfactory. In one case a man, aged about 35, in the second stage, although temporary improvement occurred at first, after a time the temperature increased and the patient wasted; night sweats returned and the patient's condition gradually deteriorated. In another, a married woman aged about 30, in whom phthisis came on probably from over lactation, and in whom there were well-marked signs in the left apex, there was also for a time improvement, which proved not to be lasting. The treatment of the lupus cases at Addenbrooke's Hospital had also been unsuccessful, most, if not all, having deteriorated rather than improved.—Dr. ROBERTSON drew attention to the similarity in the effect of tuberculin upon the pulse wave to that of digitalis, and pointed out that the extract of sputum used by Dr. Philip, of Edinburgh, some time ago foreshadowed this effect upon the pulse. He thought that it should not be forgotten how often patients in consumption improved under treatment by other methods and from simple natural agencies. A method of treatment in consumption should fulfil these indications: (1) It should be harmless; (2) it should be beneficial; (3) its action should be reasonably certain. He was afraid that tuberculin as now used did not definitely and invariably fulfil any of these conditions.—Dr. R. SHINGLETON SMITH gave it as his opinion, founded on his experience at the Bristol Royal Infirmary, that, although tuberculin had been abundantly proved to be by no means the one specific remedy for use in all cases of bacillary disease, it was now and then in particular cases of the greatest possible utility. He believed that he had seen results from a course of tuberculin extending over two months fully equal to the best results from climatic or guaiacol treatment extending over two years. He hoped that the profession would as yet withhold its judgment and not decide against a remedy which had much evidence in its favour, for a disease in which all inferences were beset with fallacies.—Dr. RICHARDSON advised a waiting policy. The results obtained in places like Torquay, Bournemouth, and Ventnor were so poor that it was wiser to wait until those in charge of hospitals had studied it and given the result of another year's treatment. He related three cases.

Treatment of Consumption by Guaiacol and Iodoform.—Dr. R. ROBERTSON read a paper which is published at page 1040.—Dr. SHINGLETON SMITH had used injections, subcutaneous and intrapulmonary, of various antiseptic solutions, and had not found altogether satisfactory results therefrom. He believed that both iodoform and guaiacol were most valuable drugs in the treatment of phthisis, but he had not found any difficulty in

introducing these drugs by the digestive tract in much larger doses than was possible by hypodermic injection.—Dr. E. MARKHAM SKERKITT had always held that the administration of remedies by the mouth in cases of phthisis was preferable to their injection either subcutaneously or into the substance of the lung. Subcutaneous injections were inconvenient and troublesome to the patient, and were open to certain other practical objections. Further, the amount of a drug introduced by their means was comparatively limited. Intrapulmonary injections had been adopted with the view of bringing the remedy into direct contact with the diseased tissue of the lung; but all clinical experience went to show the impossibility of mapping out by physical signs the exact condition of the lung with any certainty, as it was common knowledge that areas of disease might exist which gave rise to no localising signs; hence the impossibility of placing any reliance upon the action of injections into the substance of the organ. He had found no difficulty in administering creasote and guaiacol by the mouth in doses of as much as 25 to 30 minims in twenty-hours.—Dr. SINCLAIR COGHILL could bear testimony to the favourable results of the treatment described by Dr. Robertson. He was inclined to refer the good effects to the action of guaiacol. It was a remedy largely used now in the treatment of phthisis, especially on the Continent, where it was given in large doses by the mouth in combinations which tried the stomach greatly even to read of. He could not understand why it was not administered in capsules, as he had long been in the habit of doing where he could not give it hypodermically. Used subcutaneously it was by far the most potent and safest of all the antipyretics. It had a property which made it superior to them all. Not only was the temperature lowered as certainly, but it remained so for a longer time, and the temperature very rarely fell much below normal, so there never was any danger of the collapse which so often threatened to supervene with the various antipyretics of the coal-tar series. Dr. Sinclair Coghill had first been induced to use guaiacol hypodermically in consequence of a communication from Dr. Shetelig, of Nervi. In a case which had also come under his friend, Dr. Robertson's, notice, nothing could have been more remarkable than its effects, for the patient, who was almost moribund, was now alive and well. It was a case of double septic pneumonia undergoing retrograde change.—Dr. ROBERTSON, in reply, said he was glad to have an opportunity of bringing to an issue the point of distinction between the method of treatment contemplated by the introduction of large amounts of a drug such as that practised by Dr. Shingleton Smith and that of Professor Picot. If $\frac{1}{2}$ -grain of iodoform accomplished as much as 30 grains, why give 30 grains? The question involved was no doubt whether the remedy acted upon the host or upon the parasite. The teaching of these cases was that the drugs acted upon the host, and all benefit in the treatment of phthisis appeared to result from this action upon the host, not from action upon the parasite.

On the Use of Dog's Serum in the Treatment of Tuberculosis.—Dr. C. BERETTA read a paper which is published at page 1041. —Dr. BRUNTON mentioned that he had received from Professor Richet some tubes of dog's serum. These had been tried on two patients. In one case the patient—under the care of Dr. Christopherson, of Hastings—showed decided improvement during the injections, and when the supply of serum failed the patient did not feel so well. There was difficulty in getting dog's serum in this country, so he had tried to get goat's serum. This did not become readily clear like dog's serum, for the corpuscles did not separate well, and the serum afterwards frequently appeared to become cloudy, but whether this was due to a kind of coagulation or not he was unable to say. The serum of dog's blood, although not a cure, seemed to be useful as an aid in the treatment of tubercle. He had also seen in Paris a case of syphilitic cachexia in which Professor Fournier found it succeed when everything else failed.

THE late Professor C. Wedl, the well-known histologist of Vienna, whose death was recently announced in the BRITISH MEDICAL JOURNAL, has left the whole of his estate, amounting to 100,000 florins, to the Mathematico-Physical Section of the Vienna Academy of Science, of which he had been a corresponding member since 1849.

MEMORANDA:

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

BLACK TONGUE.

A CASE of black tongue similar to that described in the BRITISH MEDICAL JOURNAL of October 31st, by Mr. Lake, came under my notice recently. The patient was an elderly lady subject to dyspepsia, very abstemious in her habits, leading a sedentary life.

The patch had existed for two or three days before I saw it. It was situated nearly in the centre of the tongue, just in front of the circumvallate papillae, and was about the size of a shilling piece, of deep umber-brown colour, no part actually black, its surface moist and raised above the general surface of the tongue, with edges sharply defined, suggesting the idea that it could easily be stripped off, but on attempting to do this I found that it was firmly adherent, and I could not detach even a fragment for microscopical examination. The rest of the surface of the tongue was coated with a thin white fur. I put the patient on a mixture containing nitric acid and nux vomica, and told her to rinse her mouth frequently with a little lemon juice and water. Under this treatment the patch entirely disappeared in a couple of days, the patient stating that "a small part of it came away like a scab." I found no clue to the cause of the formation of the patch either in the food or liquids taken by the patient, or in the state of her general health. There was no complaint of dryness or of bad taste in the mouth.

This is the second case of "black tongue" that I have seen within the last twelve months. The first case was in an elderly man, a great pipe smoker, and in his case I rather inclined to the idea that the tobacco had something to do with the colour of the patch, which was quite black in the centre, shading off to a dark brown, but the patient said that he had smoked nearly all his life, and had never had such a patch before. Nitric acid and nux vomica were administered in this case also, and the result was equally speedy and satisfactory.

By the valuable aid of Neale's *Digest*, I find that similar cases are recorded in the BRITISH MEDICAL JOURNAL of 1884, vol. i of 1886, vol. ii, and of 1887, vol. i, but in none of these reports is there any satisfactory explanation of the causation of such a condition.

J. ALFRED MASTERS, M.D.Durh., M.R.C.P.Lond.

Brook Green, W.

IN the BRITISH MEDICAL JOURNAL for October 31st I see Mr. Lake has reported a case of black tongue. It may be of interest to note that an exactly similar case came under my care about 18 months ago. The patient was an Anglo-Japanese, and presented a black patch, about the size of a florin, situated on the left side of the dorsum of the tongue and in the middle third.

On drying the scraped fragments they presented a brown fibrous appearance. No special treatment was adopted, and the patch passed away in about three weeks. The patient said he had had a similar patch once before, but on the other side of the tongue.

At the time of observation he was being treated for persistent vomiting with slight signs of phthisis, and some six months afterwards he died of phthisis in South Africa.

Brondesbury, N.W.

J. ANDERSON SMITH, M.D.LOND.

EXTEMPORE UREA ESTIMATION IN URINE.

A NUMERICAL estimate of the quantity of urea in urine is sufficiently important to justify mention of a ready approximate method, without any further apparatus or reagent than those usually found in ward and surgery.

A one ounce "male" glass syringe, graduated with a file in half drachms, and liquor sodæ chlor. B.P., are the only essentials, besides an ordinary measure graduated to half drachms, and a shallow test glass. The urine is diluted with an equal quantity of water, and of this half a drachm is drawn into the syringe. Then about three drachms of liq. sodæ chlor.,